The SHORT WAVE Magazine

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VOL. XXXII FEBRUARY, 1975 NUMBER 12

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FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT WAVE Magazine

EDITORIAL

Division

The pattern of Amateur Radio as we know it now has taken a somewhat unexpected form from that we have known in the past and with which most readers of this piece will have grown up.

Aside from the "operating a black-box" fraternity—applicable to any band—there are now two distinct and almost unrelated bodies of U.K. licensed amateurs: Those free to rove round all bands, and those who are confined to the VHF/UHF areas. There is no harm in this, nor are the G8/3's (of whom the numbers increase steadily) to be regarded as in any way "peculiar".

But what it does mean is that, for the first time in the long history of Amateur Radio, we have a large and active body of radio amateurs who, because they are VHF/UHF specialists, really know nothing about Amateur Radio in the wider sense because they are confined to a relatively narrow and restricted field of on-the-air activity.

There is no harm in this. It is just a newly-developed situation which we recognise and understand. And, of course, there is nothing (except passing the Morse Test!) to prevent a G8/3 breaking out of his confinement to become a G4/3, as indeed many are doing—see the "New QTH" lists in this and recent issues.

What is rather difficult to understand is why the Morse Test should be regarded as such a barrier. Nowadays, there are far more aids to learning Morse than ever there were before, while in the early days there were none at all. Yet great numbers of amateurs were able to qualify by being entirely self-taught. And to them, possession of "a good fist" was a matter of pride, something to be striven for and developed—like that nice, steady, correctly spaced, rhythmic sending, readable at any speed, that today you hear only from the ace operators, who strive to make their Morse as readable as print.

Austin Forsyth
G6FO

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

THERE is one thing about the combination of mid-winter band conditions and a sunspot low—it at least enables one to become re-acquainted with the merits of using the soldering-iron or reading up the literature. On the other hand, at least we know it can't get *much* worse, and that in about seven years we should be getting ready for the next downhill slide.

The Contest Scene

Lack of sunspots does not seem to inhibit the contest-minded types. This time we have (courtesy W1WY, as ever) the results of the 1974 CQ WW WPX Contest. Although for 1974 there were no U.K. stations in the top-scoring box, a look down the listings shows that there are still some congratulations to be handed out. As compared with the winning score for a single-operator all-band of 1,936,938 points by CQ6LF, and the leading 14 MHz single-band score of YU2CDS, (845,568) we see G3HTA rolled up 306,138 for an all-band best G entry, and YL G4AYL/A clocked up 397,544 from no less than 776 QSO's and 229 prefixes. GM5BCV was the only GM entrant, with a nice 191,967 from 634 contacts with 183 prefixes, and GW4BLE upheld the honour of the Welsh by making 114,608 points on 7 MHz only. As for the 1975 Contest this will run during March 29-30 with the rules being the same as they have for the past few years.

SS/TV operators have their own world-wide battle over the weekend February 8-9. Eighty to Ten metres, SS/TV only; operators to exchange picture, call-sign, signal report, and QSO number starting from 001. One point a contact, saving for 28 MHz where they count two points. Multipliers: Five for each continent worked and two for each DXCC country, plus each W/K and VE call area. Final score is QSO points *times* the sum of the multipliers from each band; previous contest winners to deduct 6% from their score. Logs, by March 25 to Prof. Franco Fanti, Via A. Dallolio n.19, 40139 Bologna, Italy, including a summary sheet showing the scoring and a station description. You are expected to observe rules and courtesy in your operation.

March 22-24 sees the B.A.R.T.G. Spring RTTY affair, 0200 to 0200 GMT; not more than 30 hours out of the 48 to be "used," the 18 hours rest to be taken in chunks of not less than three hours. Exchange time GMT, QSO number and RST. Contacts within one's own country, two points, other countries ten points; a bonus of 200 points for each new country worked on each band, including one's own country. Same station may be worked on different bands for QSO and multiplier credit. Multiplier, the sum of all countries worked and the number of continents worked, once only, maximum six. ARRL Countries list is the standard plus each W/K and VE/VO call area. Final score is computed as follows: (*a*) Total QSO points *times* country multiplier; (*b*) Country points *times* bonus points *times* continents worked; (*c*) Add sum of (*a*) and (*b*) And, if your calculator hasn't burst a blood-vessel by then, write to the maker and congratulate him! But first, of course, send your entry, to be received by May 31, to Ted Double, G8CDW, *QTHR*.

Still on the contest theme, we shouldn't forget the ARRL DX event. *Phone* will be over February 1-2 and March 1-2, while *CW* will burst out during February 15-16 and March 15-16, times 0001 GMT Saturday to 2359 GMT Sunday. Logs to go to ARRL Communications Dept., 225 Main St., Newington, Conn., 06111. W's will give RST plus their state or province, we DX(!) types will give RST plus three digits indicating power input. Single-op stations can either enter as all-band, as High-band (10, 15, 20 only) or as Low-Band (40, 80, 160 only).

Now to the Awards. A Sheffield Award and a South Yorkshire Award are now in being, sponsored by the Association of Sheffield Amateur Radio Clubs. All the details obtainable from Peter Day, G3PHO, *QTHR*, to whom also go the applications, accompanied by 15p in stamps or three IRC's.

Most U.K. amateurs know of the WAB game, where you swap your grid number with every QSO and try to fill in all the grids in the country; it has one distinction in that it makes G3KFE rare DX, he being in TL52 (Herts) and so unique! However, to be serious, G4BFY the WAB contest manager, writes to mention the WAB contests, dates as follows: *HF Phone*, March 16; *HF CW*, April 6; *LF Phone*, May 11; *LF CW*, June 1—and, for relaxation, VHF on July 20. All are twelve-hour affairs, 0900 to 2100z, and of course all the profit from the whole WAB/HAB complex goes straight to RA1BC, which must be the most worthy cause for any amateur to support. Details beyond this can be obtained from G4BFY—*QTHR*.

The first week in August sees the World Scout Jamboree, at Lillehammer in Norway, and from July 29 to August 7, LC1J will be on the air from there, operating a CW, SSB and SS/TV station set-up, all bands Eighty to VHF—and of course a special jamboree QSL to all QSO's *and* for SWL reports.

Top Band

Between the time this piece leaves your scribe and arrives on your respected door-mats, dear readers, One-Sixty is to undergo the annual war-dance, better known may be as the CQ WW 160 Contest, on January 24-25. Doubtless there will be the jubilant ones, and there will be the would-be aerial designers muttering "Curses—back to the Drawing-Board!"

Talking of DX, a fine Christmas Day present came the way of G2BJY (Walsall) when he raised his first W, in the shape of K1PBW. This effort should go a long way to encourage the "tiddlers" to take some pains with the aerial/earth system, as the writer would think Geoff has the smallest aerial system, other than a vertical, that has ever got over; one recalls years ago a G who made it with ten watts to a quarter-wave, but Geoff's little bit of real-estate won't allow anything near that—forty feet would be nearer the mark—but of course, he has "done something" with the earthing system and has around three hundred feet of wire down in the garden under his lovely crop of vegetables. Unlike so many other of the "back-marker" stations who bleat about the Big Boys, Geoff realises that besides the big aerials they have the good ground from which to launch their big signals, and so, by emulating the work there he gets over, too. And, we could comment, he is a pretty colossal signal to your scribe. And, incidentally, G2BJY is now on SSB, having changed his home-built ten-metre Sideband rig to Top Band.

Turning now to the vexed question of the new administrative areas, G3KFE managed with the help of his local library service to obtain a copy of the relevant document, namely the Local Government (Scotland) Act, 1973. Studying this, it becomes quite clear that the *Geographia* map we originally worked from is seriously in error; the Regions are correctly titled as follows: Highland, Grampian, Tayside, Fife, Lothian, Borders, Central, Strathclyde, and Dumfries & Galloway, plus the Orkney, Shetland and Western Isles, leaving us to retain our original "Inner Isles" definition as it was, namely Arran and the off-shore islands within the existing county of Argyll. Thus, our "Inner Isles" are all taken out of the Strathclyde Region, for our own purposes. If you can lay hands through your local public library on a copy of the Act, the parts to look at are Schedule 1, starting at around page 150 and going on to 159, the later pages referring to the actual parishes and districts involved, and if you take a Zerox copy of these pages, you are "home and dry."

G4BWP (Henlow) reports his operations on the Top Band scene, and his Table entry, comprised of AM and CW contacts; he seems to be getting nicely into the swing of things here.

The Stateside news this time comes in from W4WFL/1 (Farmington, Conn.). Morgan notes, first, that K2FJ is planning an exercise in the Caribbean, to include Top Band; the calls to look out for in February are, 13th to 19th, VP2EEC and February 20 to March 2, K2FJ/VP2D. During the *CQ WW DX* contest CW leg, 6Y5BF (a disguise for our old friend W2EQS that was, now W9NFC) has a party; staying on a few days after the contest, Charlie ended up with 327 QSO's in 15 countries. Back home, 54 weeks of W9 operation have yielded a country score of 36—not bad going for 160 metres! W4WFL/1 himself made the odd contact on the band, notably HH2WF, KZ5AA and PY1RO, all new countries picked up during the ARRL test.

GM3YOR (Kirkcaldy) seems to have had quite a busy time on Top Band. Drew worked 22 countries during the *CQ WW* event, including all continents, the notable ones being VK6HD and VP8NP; nearer home one notes DJ6QT/CT3, who does not seem to have been mentioned by others.

Another player in the contests was G3ORP (Maidstone) who, at the time of his letter, was still putting things back together after carting the rig to G3TRF for MCC. Peter must be the original sleepless wonder, for apart from his operating activity, he has been carpet-laying, designing a small beam for the HF bands, a VS1AA variant for VHF-refugee G3VTT, a T-Notch filter with Q-Multiplication for 1·8 to 2·0 MHz use (fitted in the receiver feeder), an HF crystal-controlled converter, a Q-Multiplier for the 5-9 MHz region for use with these SSB transceivers on CW, and an AF low-pass filter to add

into the loudspeaker leads, not to mention an intent (New Year reolution?) to tidy up the shack! The G3ORP signature this time was a delightful-looking drawing of a pot of foaming ale.

The usual interesting letter from G2HKU (Sheppey) comes in duplicate this time, his offering having just missed last month's collation. During a QSO on Eighty, 4S7UD asked him to listen on 1832 kHz for him, with no result; however, Ted tried for thirty minutes to raise DL1FF, who was blocking his receiver front-end, to tell *him* to listen for the 4S7—but no joy. G2HKU is yet another to complain about the Phone natterers on 1836 kHz, moaning at the lack of DX while OK and DL are sitting underneath them on CW. On a different tack entirely, G2HKU recounts how PAØHIP got himself an inverted-Vee at 220 feet high during the contest, by borrowing the local building-site crane jib as the "mast" for the weekend! PAØPN, PAØABM and PAØINA operated from a pumping station on the dunes, and found the noise level to be zero, when at home it was its usual S7.

G4AYS (Moira) still presses on with his QRP, 600 milliwatts on 1844·79 kHz, and managed to raise GM3ANO for Sutherland, GD3FXN in the Isle of Man, and a couple of OK's; his claimed score now goes up to 52 points.

On to G4BOH (Bury), who goes up by 24 points to 59; Chris is having a struggle to get out to the North, OK's being far easier to raise, so a plan is afoot to get the current portion of the aerial up above the house level and more in the clear. One is interested to note that the proportion of CW loggings for G4BOH has risen from less than 20% to above 40%, obviously indicating that Chris is finding CW more of a pleasure than it previously was—and also that there is more CW activity on 160 metres?

G3ZKE writes to remind us of the Grafton Contest. As before, there are three legs: AM on March 22, CW on March 29, and SSB on April 5, in each case from 2130 to midnight zulu. You must enter two sections only if you intend to submit a log and entry; it is "individual"—not a Club affair. Certificates to the first and second overall, and additional parchments to the winners of each individual section. Logs to be postmarked not later than April 20, addressed to B. C. Bond, G3ZKE, *QTHR*, to whom also should go requests for further information. All your old conductor needs to add is that this affair is far from being a purely-Grafton "do" it having grown over the years to embrace the whole country, with entries from folk who have never been within 100 miles of the Grafton Club.

QRP Points

The devoted work of G3RJV in the formation of a U.K. QRP Club is *definitely* showing signs of bearing fruit, and George has received many letters indicating support; he has also produced the first issue of the proposed newsletter, called *Sprat*, a name invented by G3DNF from "Small Powered Radio Amateur Transmission." A subscription level of £1·25 per year has been suggested, to include the quarterly (at first) Bulletin, plus, as may be felt necessary, "QRP Briefs" which will cover additional material of interest to the QRP fraternity. There is also the possibility of a get-together, either as a convention or a meeting somewhere in the middle of the country and convenient to all. In general, the aims will be the support of the QRP operators as far as possible, and the encouragement of QRP working, plus, hopefully, the attraction of the younger and more impecunious would-be licensed operators into the licensed ranks by way of the cheap and simple QRP home-built rig. At present, the proposal is that the limit be a nominal five watts, with an absolute maximum of ten watts, the latter to attract the Top Band types into the ranks; in fact five watts of output "up the spout" is about right for the average ten-watt rig, once the losses in the coupling arrangements are accounted for. *Please*, all those interested in QRP working, write to G3RJV, at 61 Park Street, Cleethorpes, Humberside, and preferably include a sub. G2NJ (Peterborough) again reports a number of interesting contacts with U.K. QRP operators, on 80 metres, mainly day-time.

The Lighthouse

Some more notes, which should be read in conjunction with the picture on p. 598 last month. The lighthouse was completed on Bishop Rock in 1887, and is 170 feet high, standing on a bit of rock measuring 150 by 50 feet at low water, submerged at high tide. The rig there is a Heath HW-12A, to a vertical aerial, from the kitchen to the top of the Lantern glazing, the kitchen being four floors down from the summit of the Tower proper. The lightning conductor is used as the "earth" and since this is joined to the wind-vane on the top of the Lantern, the earth is about fifteen feet higher than the top of the vertical aerial—how the blazes does *that* work? There are plans to put a vertical dipole up the tower side in the Spring when things are a bit quieter—the waves have a nasty habit of climbing seventy feet up the side of the tower at this time of year! If you want to work Bishop Rock, there is a regular sked between G3UUZ there and GW3ASW at 1430 clock around 3720 kHz when Andy is "abroad" and breakers will be made welcome.

Ten Metres

Interest in Ten-metre activity is far higher this time then ever it was at the trough of the last sunspot cycle, as the number of reports both of contacts and of listening watches indicate. Now comes a Ten-Metre Activity Day which has been publicised world-wide to ensure greatest cover. It is set for Sunday March 16, 0800 to 2000z. Amateurs

For the 17th J-O-T-A, the annual Scout international QSO party on the amateur bands, GB3BHK (of the International Dept. of the Scout Association) was located in the hallowed precincts of the Appleton Research Laboratory Radio Club, at the Lab. Hq. near Slough (formerly known as the Radio Research Laboratory). This picture is of particular interest because it shows Leslie Mitchell, G3BHK (left) operating the rig—he having inspired the Jamboree-on-The-Air concept, 'way back in 1957. It is now an annual non-contest event, supported by Scout groups and associations throughout the world.

and SWL's are asked to use the band between these times, and log their results, giving stations heard/worked, time GMT, mode of operation, QRG if possible. Comments on propagation and band conditions can be added to the report, and the whole sent to SWL D. A. Whitaker, 57 Green Lane, Harrogate, North Yorkshire. This is a propagation-research exercise, not a contest; as such it is doing something the professionals find hard to research, and so it is one of the "sales points" in the favour of Amateur Radio when the next allocation conference comes to be fought out. If you want a detailed summary of the results, send an s.a.e., or IRC's to OM Whitaker with your report. But, primarily, if you can come on Ten on that day and operate/listen, *do just that*, and send in your results.

Fred Phoney Again

Someone, signing himself "ZC4EJ," is quoting G3ZCC as his QSL manager, and the latter is being inundated with QSL cards. Where IRC's are enclosed, G3ZCC is returning the cards, but it is all an unwelcome chore for him, particularly as he himself is Top Band only. If anyone comes across this ZC4EJ goon on the air, please unmask him for what he is.

Planners

Are making a nuisance of themselves for G4BUE (Brighton), he having had his application for planning-permission for a sixty-foot Versatower of the crank-up type refused. However, he is at the moment exploring avenues for a compromise, the while preparing material for an appeal in the formal sense. To this end, he wants details from any other amateur who has achieved planning consent to his mast/aerial system, either initially or as the result of an appeal; please write to Chris Page, G4BUE, *QTHR*, direct, or alternatively make your comments on a separate bit of paper, enclosed with your report to this piece next time round, and 'KFE will forward to G4BUE.

IRC Note

Thanks to W4WFL/1 we have a paragraph in *Linn's Stamp News*, referring to the introduction of the new IRC design from January this year. Basic changes are that the front is now entirely in French, with the back carrying the statements in various languages, as of yore. Old-type IRC's will continue to be honoured, in U.S.A. at least, until December 31, 1976.

Eighty Metres

Not so neglected as usual, thanks largely to the QRP merchants. Let us look through the clip, "as it comes."

First off, we have a letter from G2FUX (Ringwood) on the RAOTA, open to those with 25 or more years of licensed Amateur Radio operation. There is a net, 1100 clock-time, formally on the first Thursday in the month, and informally on every other Thursday. So far, about sixty members have chipped in, and there are still more to be recorded; so make yourself known. As for RAOTA itself, the details can be obtained from Miss M. Gadsden, 79 New River Crescent, London, N13 5RQ, or by breaking in to the Net.

G8HX (Mansfield) worked four W stations on the run on Eighty one night during the Christmas break, with reports varying between S6 and S9, but is now QRT, having tried, accidentally, to tune up on Ten with the 14 MHz dipole connected to the output, which culminated in the *pi*-choke in the DX-100 departing in a cloud of blue smoke. Frank is a bit pessimistic about his chances of laying hands on a direct replacement, but surely, somewhere, someone, has an old DX-100 kept for spares, from which he could spare the choke? If that fails, a possible design appears to be the American *Millen* 34300-752 type which is current production—this firm have been supplying to the amateur market for years.

Playing with QRP has occupied G2NJ (Peterborough), Nick having had QSO's with G3FMW (Harrogate) his input being two watts; G3DNF in Leeds who had three watts; G3GET, Sittingbourne running 1·5 watts; G3YCC, Hull, three watts, and G3IGU near Doncaster who was down to 850 milliwatts. A different sort of QSO came up on Christmas Day, when, around 2330, a contact was made with PI1LC/MM, on the Dutch weather ship *Cumulus* (c/s PDMV), at 2° East on the Arctic Circle.

G3YHC and G4CTU, with GW4AES (Anglesey) get together on 3795 kHz every Saturday morning; they are all employed by, or connected with the textiles industry, and they would like anyone else in the same industry who is interested to join their group.

G4DMN (Wirral) wrote just before returning to school at Shrewsbury. The gear at Parkgate is the FT-501, coupled, for Eighty, to a dipole sloping from forty down to 20 feet at the opposite end. Operating times were 1700 to 0100 and 0600 to 0800, and this routine yielded best contacts as CN8HD, CN8BF, EA8CR, FC2CA, HI8LC, CR4BS, CT2's, CT3AT, W1, W2, W4, KP4AN, KP4BCL, KZ5ED, OA5IO, OE5CA/YK, OJ0MA, PY2FXH, some Russians, OX3RA, VP1FF, VX1FG, 9M2DQ, SU1MA and YV5ANS.

The two letters from G2HKU indicate some CW and SSB activity; on SSB there was OJ0MA, while on CW there was a contact with 4S7UD, plus QRP encounters with DK7EH, OK1JRS and SM4CFL.

G4BWP has been playing with a VS1AA on Eighty, energised by his FT-DX100; the aerial seems to improve European coverage, but to date the only other contact has been W1EBC, 57 both ways. On the QRP side, Derick is building a two-watter which he hopes to have going soon; he has a rock for 3580 kHz and intends to get some more frequencies. A couple of good QSO's were with G3VFA and GW4DOO both of whom had five watts.

G3RJV (Cleethorpes), who we have already mentioned in connection with the QRP Club, writes to let us know that there is to be a QRP Net on 3550 kHz, at 1400 on Sundays; G2NJ monitors 3575 kHz and usually works somebody QRP, around noon *every* day. A source of crystals for 3550 kHz for the net is *J. Birkett* (*Lincoln*) a regular advertiser in *SHORT WAVE MAGAZINE*—but if you do contact him, mention the G3RJV note and he will sort you one out of the box he has of "various frequencies," which otherwise you would have to rummage through. We might add, that since friend Birkett is doing so much to help, an s.a.e. with your letter would be no more than courteous.

Reporting the HF Bands

Forty Metres

Still largely ignored, which is rather strange considering the way Twenty has been behaving this winter. G2HKU worked CW with PJ3SF, PY7ADL, FG7AN, UD6HU, 8P6AK and UL7NAR, while the SSB accounted for EP2TW, EP2VJ, FY0BHI and HI8XKP. It is interesting to note that Ted had several contacts with PJ3SF, and each time it was the PJ that called G2HKU.

G4DMN, as has already been remarked, worked Eighty more than anything; it seems the forty-metre plans received a bit of a setback when Richard discovered that his inverted-Vee for 40/15 metres was working the neighbourhood TV sets—we know the feeling, it's a bit discouraging!

G3ZGC/MM is on *Esso Scotia*—ship's commercial call GZJG. Richard uses an FT-75 with crystals on 7025 and 14025 kHz. Forty has produced, for the best QSO, one from between 4S7 and 9M2 with a JA who claimed the /MM signal was stronger than the BC station on the frequency!

Forty for G2BJY was largely a question of chasing the DOK's for the DLD award; and just earlier, Geoff had received his R-100-0 award from Box 88, together with his cards and a letter.

Twenty Metre Band

G3ZGC/MM mentions an interesting contact on 20m., when he was near Sri Lanka (Ceylon); his CQ was replied to by BV2A, in Tai Pei. This station is quite OK and has been around for a while now, though rarely if ever mentioned by correspondents. On the general run of contacts, few were with Europeans, mainly Asia/USSR/VK filling the log.

G4DMN reckons the noise on the band probably obliterates his dipole signal, to judge by the lack of response from the DX. However he did manage to work HV3SJ, W's and K's, MI1, SM5CGA/YV5, TF3HP, various Russians of whom the best were UL7YP, a YL operator, some VE's, ZL3QN and 9Y4CR.

The Belgian raft we mentioned last time was worked by G2HKU, as were ZL1VN, ZL1KB, ZL1NW, ZL3RS and ZL3SE, all SSB, plus KP4EAS on CW.

W4WFL/1 has pretty limited operating time, so most of his contacts were achieved by being tipped-off about a choice bit of DX, nipping into the shack, and (hopefully) working it; this procedure accounted for KC4N1 on both modes and several bands, EP2VJ and 3B9DL, this last on the key. As for the latter, Morgan reckons the pile-up on him on 14 MHz CW was quite as bad as anything ever heard on SSB—it made him feel inclined to QSY to Seventycems!

CW it was for G3UZ. George suffered a certain amount of bother with his aerials, the 300-ohm ribbon not being strong enough to stand up to the environment at Goring-by-Sea! Nonetheless, the odd CW contact was made, among them VU2GW, ZS1A, ZS1RM, 6Y5AR, FG7AO, CO2VG, VP2MSO, HR2RM, W7ZC, W7NHG, W7NW, EA6CD, EA6BP, FP8BR, K6ZR, EA8BK, 9H1CH, PY7DF, PY1DUB, PY7ASV/5, PY7APS, UH8BAU, UI8CQ, UA0YAD, UK0BAE and a load of OK30, LB and LJ stations.

(For the feeder problem, try slotting the ribbon by cutting out

9in. or so between half-inch "bridges" left by the slotting. This can be done quite easily with a pair of sharp scissors, bending the ribbon back 4½-5in. to do it. Thus, windage is much reduced and also the tendency of the ribbon to "hold water" in heavy rain. You are left with a 300-ohm line in "ladder" configuration, the impedance characteristic not being affected. The make-fast at the aerial end should take in the insulation, to maintain the line-strength of the ribbon.—*Editor.*)

G4BKY (Dursley) uses an HW-7 into a dipole at fifteen feet, with which modest installation he has WB2MAN, W1TW, UN1BR, UR2RDI a load of UA1, UA2, UA3 stuff, also about twenty of the more common European prefixes—which all goes to show what QRP can do, and what it does for the skills of the operator.

The Mini-Beam at G3YRR (Grimsby) took an awful pasting during those pre-Christmas gales which gusted far higher than the claimed performance of the aerial. When it was all over, a little tweak on the guys brought the upright section back as vertical as ever. Not so, one has to admit, the G3KFE aerial which now has a list to the eastward from about half-way up the radiator, giving the thing a markedly drunken look—but the 28 gauge long-wire didn't budge an inch! As for conditions, G3YRR thought so much of the HF bands that he retired to Top Band!

G4CXM (Bristol) has dropped his /A at this location at last, but it didn't help to work any more DX—his total "take" included ZL2UW, IS0XWP and some W's, with SSB working to CT3AF, FC9UC, G6ZY/CN/M and W4TXL—who was running a six-over six with the elements at, respectively, sixty feet and ninety feet! On an operating note, G4CXM comments on the usefulness of the IRT, or "clarifier," on transceivers or SSB receivers with an audio filter tacked on; looking only where the filter lets you frequently misses calls a bit off frequency, which a little twiddle in either direction will usually reveal.

Nice to hear again from G3NOF, back on the bands after his illness. Don finds Twenty opening around 0800 with Italians, the VK/ZL long-path stuff following at around 0830 until, sometimes, as late as 1045. West Indians, and PY's show up by 1000, and the East Coast W's around 1200 to about 1900. From 1600 these have been sometimes joined by VE7, W6 and W7, and Africans have been noted from 1700, usually fading out by 2000. A few ZS's were heard as late as 2345, working the U.S. An interesting point is that, although Twenty has often gone dead for DX at about 1900, there have followed several brief openings lasting about five minutes. The G3NOF log shows contacts with A2CCY, JR6EA, KP4EAK, TU2CJ, VE6APJ, VE7GZ, VE7MT, VK2AMD VK2ASC, VK2BZM/VK9 (Norfolk Is.), VK3ALH, VK3TG, VP80A, W7HQC, ZD7FT, ZL2BS, ZL4AV, ZL4BX, ZS1ANT, SZ1DD, ZS1KZ, ZS1OU, ZS5DP, ZS6DI, ZS6IR, ZS6JL, ZS6JW, 5Z4RT, 8P6FW and 9G1AR.

Next we have to note the return to the fold of G3DCS (Ipswich) whom we thought had sunk in the North Sea. Enver has been kicking around the bands as usual but, sadly, with no more than Europeans and W's, which he considered not worth reporting until it dawned on him that most of us were in the same boat; G3DCS is yet another to comment on how the bands have dropped since this time last year, when already we were griping about conditions! Just to show he has done *something* in the shack, Enver enclosed a colour photograph of a painting, done by himself, of G3DCS operating NFD in 1949, based on a colour picture taken by G5WW, who also owned the gear—one good way of making an old, and maybe dog-eared, photographic print into something a little more permanent. On a different tack, G3DCS has turned his 14 MHz ground-planes *upside-down* with great success. Basically, what he has done is to tape the two radials for each ground-plane to the eighty-metre dipole, and let the vertical portions hang straight down instead of straight up; this means feeding the ground-planes at the junction with the radials, just as usual except that this point is now up in the air and in the clear—thus, the useful parts of the aerial are many feet higher in the air with correspondingly better results. Also, having the two of them, they can be used either alone or fed as a pair in various phases to give directivity and gain. Over the Christmas holiday, G3DCS was able with this set-up to work W9BR, W1CY, W1PL, WA1ICU, WB9LDW, VE2BYR, K9DDA, WB0HHC, WA5JMK, W2SR, WA3NGH and several Europeans.

Fifteen

Perhaps the most revealing comment is that of the chap who remarked of 21 MHz—"A Good Band—when it's open!"

G4DMN was pleased that it did co-operate with the school authorities by staying fairly good while he was on holiday; this helped him work A4XFP, CT3AR, EL9C, KI-2-3-4, K5AJ, W5KMZ, WA5ORP (all Texans), KP4BCL with whom G4DMN nattered for an hour about aerials, also KP4DLO, LU2AFH, LU7AJF, PY2FJP, PY2GNR, PY4SA, PY6AFZ, YV5ENS, 3B8AX, 6W8FP, 8P6FU, and 9G1LZ. Not at all a bad haul—in spite of what "conditions" are alleged to be!

Top Band Counties

October — September

Callsign	AM	CW	SSB	Total
GM3YOR	—	114	22	136
G2BJY	9	120	5	134
GD4BEG	—	82	11	93
G4BWP	27	54	—	81
G4BOH	9	28	12	59
G4AKY	—	46	16	62
G4AYS (*QRP*)	—	52	—	52

Each county may be worked once in each mode. AM contacts score three points, CW two points, and SSB one point, a maximum of six points per county. AM contacts made by changing from SSB after establishing contact are not allowable, neither are cross-mode QSO's. New U.K. County designations apply.

Starting date October 1, 1974. Closing September 1975.

Fifteen for W4WFL/1 seems to have been pretty good, too—5W1AU, 5W1AV, ZM7AH, HH2WF, FW0DX, FW0IC and 5H3JL all counted as new ones.

Two phased vertical dipoles provide the link with the outside world on 21 MHz for G3DCS, and they worked out (CW of course) to 9H1DP, W9BR, UA6CP and some Europeans over the Christmas holiday break.

G3NOF heard nothing of VK/ZL in the mornings, nor yet from the Far East at times when he was able to listen round; Africans have surfaced at 0900 and stayed in till 1600, while the U.S. started to show around 1230 and stayed in till the band closed, around 1700 usually. SSB QSO's were made with East Coast W's, A4XFP, CR7AF, TR8VE, ZD3G, ZD3R, ZD7SD, ZE1AB, 5N2ESH, 9G1AR, G91LZ, 9J2DT and 9J2WR.

The QSL Front

G3NOF mentions *5Z4RT*, to DL9ZB; *ZD7FT*, to VE1AIH; *ZD3R*, to G3LQP; *ZD3G*, P.O. Box 165 Banui; *8P6ES*, to K4GLJ; *A4XFP* to P.O. Box 248, Muscat, or through the Bureau; and *ZS1ANT*, to ZS5FA

G2HKU also usually jots a few down, this time giving us *HI8XKP*, to W0GX; *EL4D*, to WA5ZWK; *VX1KE* to WA1QBH; and *6W8FP* to WA3NCP.

W4WFL/1 has *K9KGA/6W8* to Stan Burns, K9KGA, 129 Gaslite Square, Apt. 7, Madison, Wisconsin 53713, U.S.A.; *3B9DL* to WA5ZWC; *ZF1DM* to W2BVN; *ZM7AH* to Irving Wernick, W5ZF, 11504 Golden Gate, Albuquerque, New Mexico, 87111, U.S.A.; *5W1AV*, to W6KNC; and *KC4N1* to K2FT. As if all this were not enough, Morgan lists the stations who can be QSL'ed through *INDXA, P.O. Box 125, Simpsonville, Md. 21150, U.S.A.*: FY7AF, KP6AL, AP2KS, VP2DAE, VP2SBG, ZB2AY, ZD8AY, TY7ATF, EP2CC, EP2TC, EQ2CC, ST2SA, 3A0GC, ZK2AH, ZM7AG, ZK1AJ, VR1AA, VR1AB, VR1AC, KB6CU, XT2AA, VK9NP, VK9NP/W, VE8CB, HK0AA, KS4DX, K4AEB/5T, K9CNW/CEO, W9IGW/CEO, VS5AA, VS5JA, 9M6AB, K3QOS/KB6, YK1AA, CR3AB and CR5AJ. A pretty lot of customers indeed!

Others

Space and time runs out on us, but we must conclude by making the odd mention, *viz* G3YRR making much of Amateur Radio on "Radio Humberside," the week after, on the same programme, members of the Scunthorpe Club had been interviewed about VHF and satellite work; the same G3YRR locking himself, out of earshot of anyone, into his third-floor shack, and actually going to the length of calling the Fire Brigade before he managed with a screwdriver to slip the lock and escape!

SWL J. Edwards writes from Leeds to say he has a QSL from LA1SH/MM when the operator was on Weathership *Polarfront II;* so it becomes more likely that LA1SH/BY might possibly have been OK.

Finale

We have now to thank all those who have written in, the copy of *CQ Magazine's* "Contest Calendar" so faithfully sent to us every month by W1WY; to West Coast *DX Bulletin* for lots of snippets, and of course Geoff Watts' admirable *DX News Sheet.*

For next month, the deadline will be February 11 latest, addressed: CDXN, *SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.* Till then, happy hunting and plenty of sunspots!

73 de G3KFE.

INTEGRATED-CIRCUIT ROTATOR CONTROLLER

SOLUTION TO A MECHANICAL PROBLEM

C. J. DORAN, B.Sc., Ph.D (G3VZH)

BEAM rotator controllers seem to be a much-neglected item in the literature, and have so far escaped integration. This design uses a dual comparator as sense element in the self-balancing bridge type of automatic rotator which directs the aerial in obedience to a remote control box.

Op-Amp as a Voltage Comparator

Fig. 1 shows an operational amplifier without feedback and having its inputs driven from the sliders of two potentiometers. The open-loop gain of such an amplifier is usually many thousands, so only at the balance point where the input voltages are within a few millivolts of each other will the output be anywhere near zero. At other times it rises or falls to one or other supply rail depending on the relative polarities of the inputs.

The principle used in a rotator is to drive RV1, say, from a motor which also turns the aerial, and connect that motor in the output circuit of the op-amp. Then if RV2 is adjusted from the balance point, the motor starts and turns RV1, hopefully in the right direction, until the inputs are equal and the motor stops.

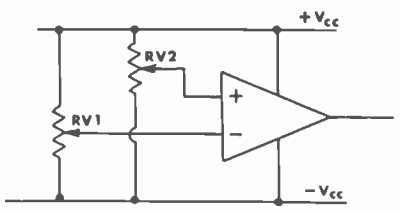


Fig. 1. Basic circuit

Table of Values

Fig. 2. Practical Circuit

C1, C2, C3, C4	= 0·01 μF 25v.	D1, D2, D3, D4	= 0A91
C5, C6	= 330 μF 25v.	D5, D6	= 1N4001
R1	= 15,000 ohms, ½w.	D7, D8	= OA10
R2	= 1,000 ohms, ½w.	F1	= 1A. fuse
R3	= 470 ohms, ½w.	T1	= mains to 15v. 500 mA transformer
R4	= 2,700 ohms, ½w.	Tr1, Tr2	= OC200
R5	= 8·2 ohms, ½w.	IC1	= SL717
R6	= 270 ohms, ½w.	ZD1	= 5·1v. 400mw. zener diode
R7	= 220 ohms, 1w.	ZD2	= 12v. 400mw. zener diode
R8, R10	= 10,000 ohms, ½w.	RLA, RLB	= 12v. relay SPST or SPDT (*see text*)
R9, R11	= 22 ohms, ½w.		
R12	= 620 ohms, 1w.		
RV1	= 10,000 ohms heli-pot		
RV2	= 1,500 ohms 1in.		
RV3	= 1,000 ohms, 1in.		
RV4	= 50 ohms, 1in.		

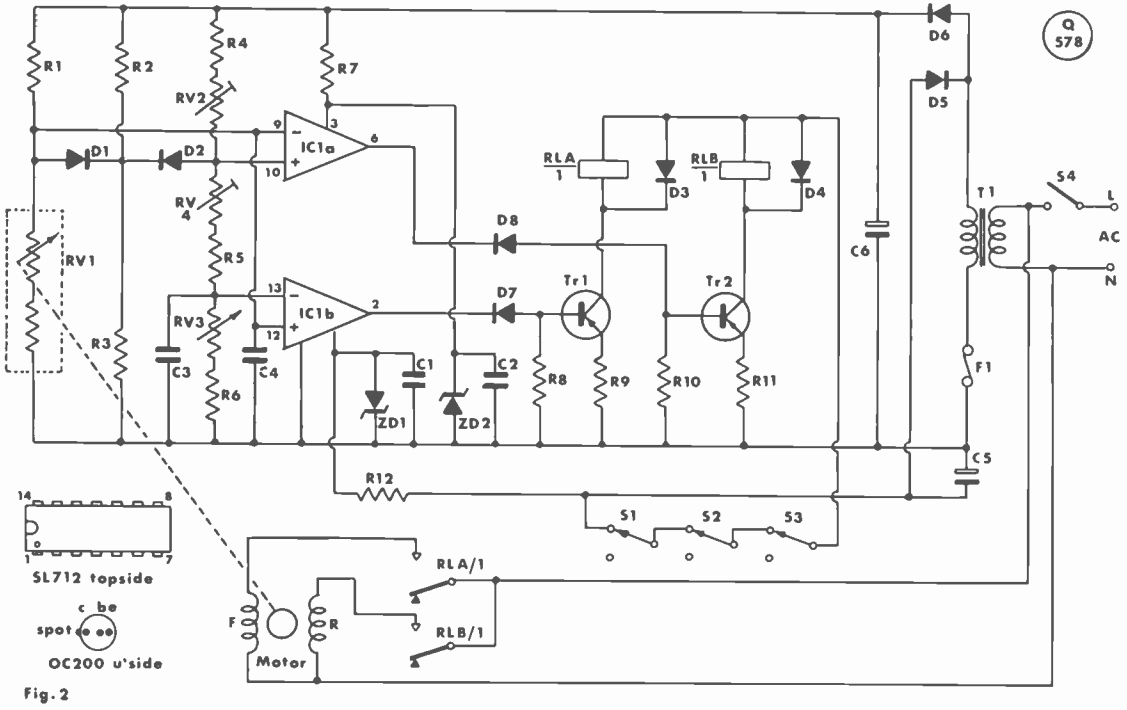


Fig. 2. A practical design

Such a simple system has been used in a chart recorder and would be suitable for a self-balancing bridge. The heavier engineering of a rotator creates problems, however. First, the motor is much more powerful, needing driving transistors external to the IC, and secondly, we must provide some dead-band to stop hunting since the large inertia of an aerial system prevents it being braked instantaneously. The second problem is solved in the present design by using two comparators, one of which senses "too far clockwise" and the other "too far anti-clockwise." A small potential difference is readily inserted to create a dead-band. We now use the "high" state of one output to drive the motor clockwise, and the "high" state of the other to send it in the reverse direction. In the dead-band, both outputs are "low" and the motor stops. Relays provide the easiest way to combine the two outputs and also circumvent the need for high power DC amplifiers.

Practical Design

The circuit of Fig. 2 is based on the SL717 dual comparator IC available from *J. Birkett*. As its name implies, the single 14-pin d.i.l. pack actually contains two separate comparator op-amps. The output swing of each is in fact —0·79v. ("low") to —2·25v. ("high"), quite small compared with the +12v. and —5·2v. power supplies, but perfectly adequate to drive a relay *via* a single medium-power transistor.

Referring to Fig. 2, RV1 is attached to the aerial shaft as sensor, and RV3 is mounted on the control box. RV2 is used to set up the bridge so that one turn of RV3 causes exactly one revolution of the aerial. The dead-band is produced by a small voltage developed across RV4.

Switching arrangements will depend to some extent on the type of motor available. The author had an induction motor with built-in gearbox and separate forward and reverse windings, greatly simplifying the relay circuitry. With the aerial too far clockwise, pin 2 of IC1 goes to —2·25v. and Tr2 is switched on, actuating RL2A, so the motor goes forward. Similarly, if the beam is too far anti-clockwise, Tr1 operates RL1A to reverse the motor. Both relays are open in the dead-band. A

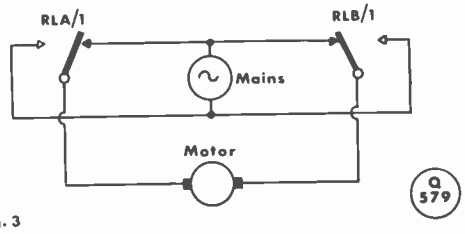


Fig. 3. Suggested switching arrangements for DC commutator motor

problem peculiar to the induction motor is that if running in one direction it must actually be stopped before energising the opposing winding. Otherwise, it continues to run in the original direction. This is a pity, because it makes it impossible to peak on a signal. The difficulty should not arise with a brushed DC motor, although the relay circuits (Fig. 3) are more complicated.

The OC200 transistors used are rather out-of-date, but it should be possible to substitute any p.n.p. transistor with adequate power (about 500mW) to drive the relays. A heat clip is desirable. The four ·01μF disc ceramics were necessary to decouple a rather high RF level present in the shack; they should be mounted as close as possible to the IC. As failure in one of the potentiometers or connecting cables could destroy the IC by sending an input well above the +12v. supply rail, D1, D2, R2 and R3 clamp the inputs to +6v. It may be noticed during testing that the integrated circuit runs warm to the touch. This is merely due to the 500mW it consumes and need not cause concern.

Mechanical Considerations

The author's arrangement is shown in Fig. 4, but variations to accommodate individual circumstances will almost certainly be necessary. Motorcycle gears and a chain couple the motor to the mast, giving a final speed of about 1 r.p.m. To allow it to take up the strain of wind movement and abrupt braking, the motor was mounted on a sprung slide. To prevent winding the transceiver around the mast in event of a fault, two

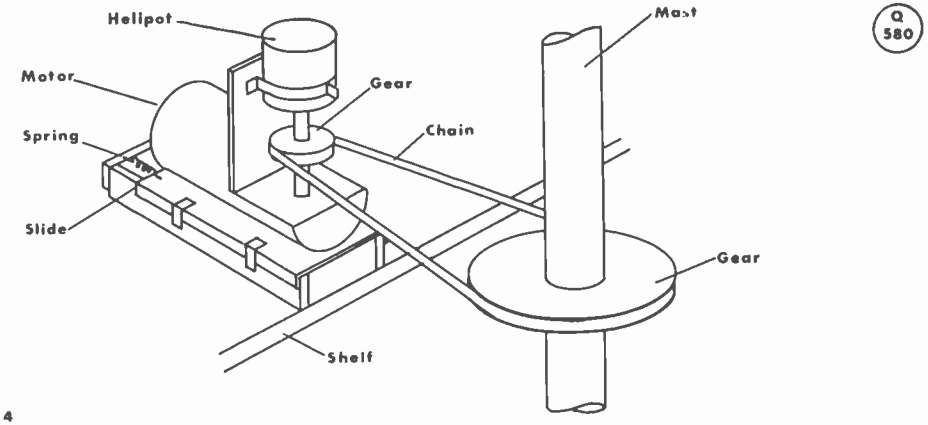


Fig. 4. Sketch showing mechanical details

limit microswitches were added to reduce the total rotation to about 450°. Because of high winds at an exposed QTH, a clamp brake was fitted to the pole and a third microswitch immobilises the rotator when the brake is on. These three switches are wired in series with the relay supply.

Various methods have been suggested for attaching sense potentiometers to an aerial mast so as to allow 360° of rotation. The author used simply a 10-turn helipot coupled to the motor shaft. This might seem an expensive solution, but these potentiometers can often be obtained on the surplus market, the exact value not being too critical as R1 can be adjusted proportionately. The gear ratio used means that only about three turns of the helipot are actually swept, and the wiper does not start at either end. Thus Fig. 2 shows it as a series combination of fixed and variable resistors equivalent to about 820 and 3000 ohms respectively. A helipot could have been used to get a 360° sweep on the control potentiometer RV3, but a geared-down tuning drive with 450° of rotation and an illuminated pointer was available from an ancient domestic receiver.

Testing and Setting-up

Those with electronic green fingers need only connect up and switch on. The motor should move to a balance point and stop. Adjustment of RV3 should result in its moving to a different balance. Normal human beings will almost certainly be met by one of Murphy's Laws, however—the motor continues to turn with the voltage between pins 9 and 10 of the IC *in*creasing until the limit switch operates. This just means that the feedback is in the wrong sense and may be corrected by reversing the motor connections. If the voltage between pins 9 and 10 *de*creases but never reaches zero, the "fixed" part of the helipot is probably too large. Initial tests will normally be made without the aerial and limit switches, in which case the circuit should find its own zero.

Should these preliminary tests not produce correct operation, check the supply voltages on pins 3 and 11 (+12v. and —5v. respectively), as different power supply components could affect these. R7 and/or R8 should be adjusted if necessary. The next test is to uncouple the motor from RV1 and turn this potentiometer by hand whilst monitoring the voltage between IC pins 9 and 10. It should be possible to take this voltage through zero, accompanied by clicking of the relays. If this is not possible, check the bridge resistors and adjust if necessary so that balance can be obtained at all settings of RV3. The balance point should be mirrored by sharp voltage changes at IC output pins 1 and 2.

Once the circuit is working, setting up is quite easy. Firstly, adjust the dead-band control RV4 to the minimum resistance to prevent hunting as balance is reached. Now set RV2 so that one complete rotation of the aerial corresponds to 360° on the scale of the control potentiometer RV3. Lastly, position the aerial mechanically so that when the pointer on RV3 indicates North, the aerial actually faces in that direction. Over the next few days, check for hunting in high winds and increase RV4 if necessary.

The same basic system has obvious application to chart recorders, self-balancing component bridges, remote tuned ATU's, etc.

RESULTS

THE 29th ANNUAL MCC

Positions and scoring

POS'N	CLUB NAME	CALLSIGN	POINTS
1	Glenrothes Radio Club, "A" station	GM4DFF/A	24,693
2	Irish Leprechaun Contest Group, Dublin	EI1AA	20,293
3	White Rose Radio Society, Leeds	G3XEP	18,632
4	University College, Bangor, North Wales	GW3UCB	18,406
5	Glenrothes Radio Club, "B" station	GM3YOR	16,320
6	Addiscombe Radio Club, Surrey, "A" station	G4ALE/A	14,425
7	Sutton & Cheam Radio Society, "A" station	G2DMR	13,419
8	Edgware & District Radio Society	G3ASR/A	13,115
9	Nunsfield House Amateur Radio Group, Derby	G3EEO	13,035
10	Oxford University Amateur Radio Society	G3OUR/A	12,215
11	Echelford Amateur Radio Society, "A" station	G3UES/A	12,152
12	Maidstone YMCA Amateur Radio Club	G3TRF	12,112
13	British Airways Amateur Radio Group, London	G3NAF	11,800
14	Chiltern Amateur Radio Club, High Wycombe	G3CAR	11,700
15	Kingston Amateur Radio Society, London	G3KIN	11,414
16	Technical College Radio Club, Dundee	GM4AAF	11,210
17	Worthing Amateur Radio Club	G3WOR/P	10,491
18	Plessey Radio Club, Northampton	G8ZK	10,330
19	North Staffs. Amateur Radio Society	G4BEM	10,024
20	Leyland Hundred Amateur Radio Group, Lancs.	G3WYY	9,730
21	Bromsgrove Amateur Radio Club	G3VGG	9,423
22	IRTS (Eire) Region I Club	EI9ONE	9,332
23	Acton, Brentford & Chiswick Radio Club, London	G3IIU	9,024
24	Wakefield Radio Society	G3WRS	8,764
25	Shefford Radio Society, Beds.	G3FJE/A	8,640
26	Grimsby Amateur Radio Society	G3YMF	8,446
27	Bracknell Amateur Radio Club	G4BRA/A	8,126
28	Addiscombe Radio Club, Sy. "B" station	G3WRR	7,956
29	Chippenham Amateur Radio Society	G3VRE	7,770
30	Mansfield Radio Society	G3GQC	7,695
31	Sutton & Cheam Radio Society, "B" station	G4ADM	7,306
32	Clifton Amateur Radio Society, London	G3GHN	7,045
33	Birmingham Univ. Radio Club	G3IUB/A	6,670
34	Culham Radio & Electronics Club, Abingdon	G3ZEF	6,240
35	Sutton & Cheam Radio Society, "C" station	G4CWH	5,264
36	Peterborough Radio & Electronic Society	G4BVM	5,058
37	Crystal Palace Radio Club, London	G3VCP	4,160
38	Thornton Cleveleys Amateur Radio Society, Lancs.	G4ATH	3,268
39	Echelford Amateur Radio Society, "B" station	G3SAZ	3,132
40	Surrey Radio Contact Club	G3SRC	2,975
41	Southdown Amateur Radio Society	G3WQK	2,360

Above are final corrected scores, in many cases significantly lower than totals claimed. It should be noted that only a few incorrectly claimed score points and one or two multipliers too many can make a large difference to the final score.

ANSWERS FOR THE R.A.E.

THE MAY 1974 EXAMINATION

The next City & Guilds Examination for Radio Amateurs—Subject No. 765 in the C. & G. syllabus—comes up in May. As in previous years, we give here a set of "model answers" to the 1974 Paper—noting that for completeness we deal with all ten questions, though in the Exam. itself only eight need be answered, the two in Part I being compulsory. What the Examiner expects is that candidates should show by their answers that they understand the questions and could expand on them if necessary. In other words, long and detailed explanations are not usually required. Formulae must of course be correctly stated and worked. To pass the R.A.E. involves getting at least 50% of the marks in both Parts, and there are grades of "distinction" and "credit", though for the issue of an AT-station licence all that is needed is a pass. A certificate is awarded to all successful candidates, showing the grade achieved. Possession of this certificate is essential for the granting of a U.K. amateur transmitting licence—it is also accepted in the same way in many other countries in which an examination pass is required for an AT-station licence. Note that applications to sit the May Exam. must be in before the end of February; your Course Instructor will have details—Editor.

THIS script was done initially, by hand as for the Exam., in the required three hours; it was then necessary to check references, make proper "for-publication" drawings and type the script. However, although candidates are only asked to do eight out of ten questions in the three hours, it is nevertheless the case that one would not expect an answer given under examination conditions to be quite as detailed as some of those here presented.

It should be realised that the RAE is not, repeat *not*, intended to be either a test of English language or of spelling ability; however, for your own benefit you should try to make your script as "readable" as possible eschewing the sort of hasty scribbling which is all too easy under the pressure of time. The point here is that marks must be lost if the Examiner cannot make head nor tail of your scribble, even though pearls of wisdom be embedded therein!

Turning now to the paper itself, most RAE courses did not include details for a full-blown VHF converter in their syllabus. However, the key is the word "simple" and this must mean that a simple mixer-oscillator such as every candidate should have off by heart will do, the only changes being to the tuned-circuit values to account for the different frequencies involved—this would certainly have gained all or nearly the possible marks. The argument is strengthened by the fact that the highest VHF, as distinct from UHF, band is 144 MHz, where conventional tuned circuits are used, and valves such as the ECF80 will work tolerably well. However, in the answer presented, a simple double-triode mixer-oscillator is used for 70 MHz.

Some candidates expressed a certain unhappiness over Question 5. However, it is well to recall that had these candidates, instead of panicking, faced up to the requirement, and considered the nearest circuit they *must* have known the waveforms for, namely the half-wave power-supply rectifier and smoothing, they would have been all but "home and dry". Commonsense would have done the rest!

RADIO AMATEUR'S EXAMINATION, MAY 1974

The examination is divided into two parts; failure in either part will carry with it failure in the examination as a whole.

The maximum mark for each question is shown.

Answer *eight* of the following ten questions as follows: *Both* questions in Part I (which are compulsory), and *six* questions in Part II.

Part I—*Answer both questions in this part*

Q.1. (*a*) What are the three conditions of the Amateur (Sound) Licence regarding recorded messages?

(*b*) What are the requirements of the Amateur (Sound) Licence regarding interference to other wireless telegraphy arising from

(i) the apparatus comprising the station

(ii) the use of the apparatus?

Answer 1

(*a*) They may be recorded from the transmission of an amateur station with whom the station is in contact, and played back to that station only; callsigns must be erased from any such re-play. Entertainment-type recordings are not to be used for any purpose. Modulation is prohibited by means of recordings of any kind other than as mentioned or by by means of special recordings of sinusoidal tones within the AF spectrum; they may be continuous or steadily changing in frequency.

(*b*) (i) The station shall be so designed, constructed, maintained and used that it does not cause any undue interference with any other station. Use of "spark" sending apparatus is specifically forbidden.

(ii) The station shall be used within the amateur bands, with a satisfactory method of frequency stabilisation, with due regard to avoidance of transients due to over-modulation and key-clicks, with adequate harmonic suppression in the aerial circuit.

(*15 marks maximum*)

Q.2. (*a*) With the aid of a circuit diagram, explain the action of a low-pass filter having a cut-off frequency in the region of 30 MHz, and suitable for use in reducing harmonic radiation from an HF transmitter.

(*b*) With the aid of diagrams explain the construction of such a filter and describe how it should be connected.

(*over*

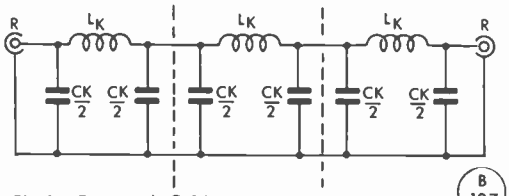


Fig. 1 To go with Q.2A

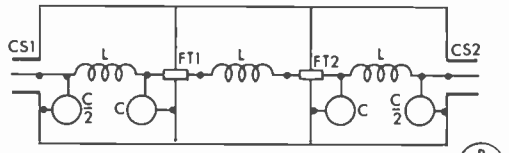


Fig. 2 To go with Q.2B

Fig. 2. The low-pass filter is built into a long narrow box (with a tight-fitting lid, not shown) divided into three sections by internal screens. These screens are pierced by feed-through insulators, Ft, and the ends of the box carry coaxial sockets, CS. Coils are arranged as shown and capacitors connected by short leads to an adjacent earth tag.

Answer 2

See Fig. 1. The drawing shows a simple low-pass filter of prototype sections. The filter is designed to go into co-axial line and would be designed to have a terminating resistance equal to the characteristic impedance of that line; the formulae for the inductors and capacitors are:

Values of L_K, C_K are given respectively by:

$$L_K = \frac{0{\cdot}318\ R}{f_c}\ \mu H \text{ and } C_K = \frac{3{\cdot}18 \times 10^5}{f_c\ R}\ pF,$$

where R is the pure resistive terminating impedance, in ohms, and f_c the highest frequency transmitted without attenuation, or the "cut-off" frequency. In a practical realisation, the intermediate pairs of shunt capacitors $\frac{C_K}{\alpha}$ would be paralleled into a single capacitor of capacitance C_K.

Such a filter would permit the passage of signals in the amateur bands 1·8-30 MHz with substantially zero attenuation, but above this frequency attenuation would rise sharply. A practical filter would give very high attenuation indeed of all the frequencies from 40 MHz upwards, possibly as much as 80 or more dB.

As to the construction, *see* Fig. 2. The filter is in a long narrow box with a coaxial connector at each end, to suit the arrangements in the station. Inside, two screens divide the box into three separate compartments; the wiring from compartment to compartment is made by a feedthrough bushing fitted into the screens as shown in the drawing. The coils are arranged as far as possible at right-angles to each other, and as far as maybe from any of the metalwork, including the lid of the box, to reduce stray coupling and losses. The lid is made to be tight-fitting and should, preferably, make electrical contact to all the sides of the box and also to the screens, to make each compartment as far as possible RF-tight.

A low-pass filter should be fitted into a coaxial line of the same characteristic impedance as its designed termination resistance, with the line operated unbalanced at low VSWR, lest harmonic energy flow over its outside. This means that the most convenient position to fit it is between the transmitter and the aerial tuning unit, one of these is used. Failing this, it can be used with any aerial having low-impedance unbalanced feed arrangements. If a balanced-feeder aerial such as a dipole is used, a balance-to-unbalance transformer will be necessary in the feeder, or the low-pass filter will have to be redesigned for balance feeder use.

(15 marks)

Part II—*Answer six questions in this part*

Q.3. (*a*) What is meant by power in an electrical circuit?

(*b*) What is the unit of electrical power?

(*c*) A 100-ohm resistor has a potential difference between its ends of 8 volts d.c.

(i) What power is being dissipated in the resistor?

(ii) In a practical circuit what power rating would be required for such a resistor?

(iii) If a current of 250 mA was flowing in the resistor, what power would be dissipated?

Answer 3

(*a*) Power is the rate of doing work and equals voltage multiplied by current.

(*b*) The watt. An EMF of one volt and a current of one ampere in a circuit result in a power of one watt.

(*c*) From $W = EI$, by transposition, $W = E^2/R$. Thus, putting in figures, we get $W = 8 \times 8/100$, *i.e.* $W = 0{\cdot}64$ watt.

(*d*) Such a circuit would require a practical resistor rated at one watt.

(*e*) From $W = EI$, by transposition, $W = I^2R$. Putting in figures, $W = {\cdot}25 \times {\cdot}25 \times 100$, *i.e.* $W = 6{\cdot}25$ watts.

(10 marks)

Q.4. (a) Explain what is meant by

(i) resistance

(ii) inductive reactance

(iii) capacitive reactance

(iv) the Q or magnification factor of an inductor.

(*b*) What is the Q factor at 500 kHz of a coil of 1 mH inductance and having a series r.f. resistance of 20 ohms?

Answer 4

(*a*) (i) Resistance is that property of a DC circuit which limits the flow of current; in accordance with Ohms Law, where E = volts, I = current in amperes, R = resistance in ohms, $R = E/I$.

(ii) Inductive reactance is that property of an inductor in an AC circuit which limits the flow of current, and is related to the rate of change of current. Inductive Reactance, $X_L = 2\pi fL$, where L is in Henries, f in Hertz.

(iii) Capacitive reactance is that property of

capacitance which is akin to resistance, and is related to the rate of change of voltage across the capacitor. $X_c = 1/2\pi fC$ where C is in *Farads*. Both inductive and capacitive reactance are measured, at the frequency in question, in ohms.

(iv) Q is the relationship between the value of X_L and R in an inductor, where R is the effective resistance at the frequency, taking into account skin effect, which makes it higher than the DC resistance. It is a pure ratio: $Q = 2\pi fL/R$.

(b) From this formula, and inserting values given in the question, we get

$$Q = \frac{2 \times 3{\cdot}142 \times 500 \times 10^3 \times 1 \times 10^{-3}}{20}$$

Cancelling through and simplifying, Q = 157.

(10 marks)

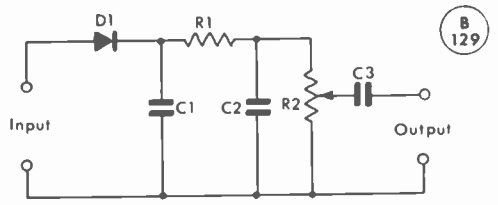


Fig. 3 Part of Q.5

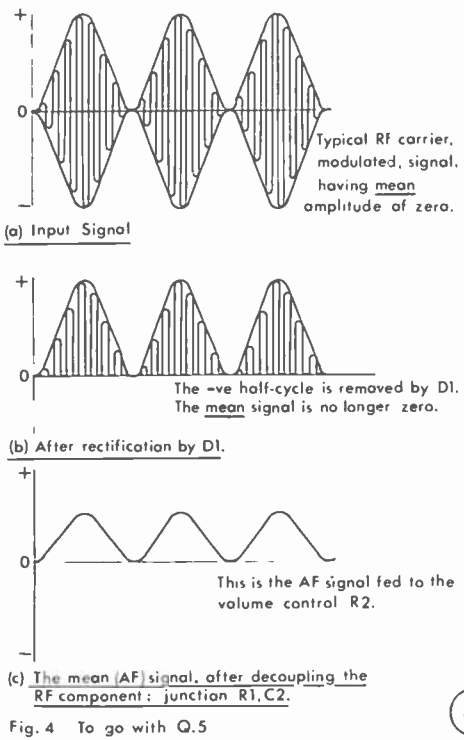


Fig. 4 To go with Q.5

Q.5. See Fig. 3. Describe with the aid of waveform diagrams the action of the circuit of Fig. 3 when used as the detector stage of an amplitude receiver.

Answer 5

Assume the RF input waveform is sunusoidally modulated at AF; this will look like the waveform in Fig. 4(a). The diode, D1, conducts in one direction only, giving, in the absence of C1, C2, a waveform shown in Fig. 4(b). From this, the RF component is decoupled by C1 and C2, leaving the AF envelope only to appear at the junction R2, C2. A proportion of this audio is tapped off at the slider of R2, and fed, through the DC blocking capacitor C3, to the audio amplifier which follows this stage. The important point is that in the original RF waveform the *mean* voltage is zero and too fast for any AF amplifier to respond or for the ear to hear. After rectification, however, the *mean* level is now varying at a rate equal to the audio frequency and with the same shape. Therefore, consideration of the time constant of the circuit will ensure that the residual RF signal is decoupled away while the audio signal at the same time is not subject to any significant losses through the same capacitors. Similarly, C3 is selected, in conjunction with R2, to ensure that the desired range of audio frequencies is passed on to the following stages.

(10 marks)

Q.6. Describe the construction of a non-reactive dummy load of 75 ohms resistance and sketch a typical arrangement for use at high frequencies. Describe the purpose and use of the device.

Answer 6

See Fig. 5. A very suitable resistor for such an application is the tubular 100-watt Morganite carbon type, with plated ends in normal service to act as contacts to the Terry-clips by which the resistor is held. The resistor is mounted, at the left-hand end of the drawing, by means of a capacitor-clip (normally used to support

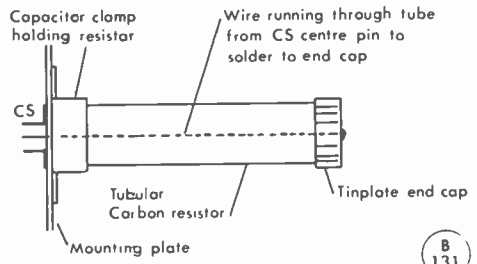


Fig. 5 To go with Q.6

Fig. 5. Coaxial dummy load, constructed as shown, will be useful even up to VHF. The mounting-plate can be one face, or a sealed container on which the lid fits tightly. Filling this with oil of ordinary engine grade will greatly improve the wattage rating, while the container itself will function as an RF screen.

electrolytic capacitors) to the mounting plate, through which is drilled holes for the coaxial socket CS, centre pin of which is arranged to protrude centrally into the tubular resistor. A wire is run through from the back of CS and out at the other end of the resistor, where it is soldered to an endplate made of metal cut out of an old coffee-tin, which is given several "lips" which can be bent over the plating on that end of the resistor, and then sweated *quickly* to the resistor plating. If the mounting plate is in fact made to be the lid of a suitable container, the dissipation can be improved by filling the container with transformer oil.

(*10 marks*)

Q.7. State the meaning of each of the following terms when used in connection with the propagation of electro-magnetic waves.

(*a*) Polarisation
(*b*) Field strength
(*c*) Maximum usable frequency
(*d*) Skip distance.

Answer 7

(*a*) Polarisation is taken as the direction of the electric lines of force. If they are vertical, the wave is said to be vertically polarised, if horizontal, the wave is horizontally polarised. Co-incidentally, this means that for the normal dipole, a vertical aerial will radiate vertically polarised signals and a horizontal dipole horizontally polarised signals.

(*b*) Field strength is a statement of the strength of the field at the receiving aerial from a distant transmitter and is measured in volts per metre.

(*c*) Maximum usable frequency can be defined as the highest frequency which will sustain communication at a given moment between two given points. It will vary with time, being in general higher for a daylight path and lower at night.

(*d*) Skip distance is the distance in a particular direction between the last point at which the ground wave is to be picked up and the first point at which the sky wave returns to earth as a usable signal. It is often loosely given as the distance from the transmitter to the point at which the sky wave reappears, on the grounds that the local coverage given by the groundwave is negligible, compared with the skip distance itself.

(*10 marks*)

Q.8. Describe a simple VHF converter designed for use with an HF receiver.

Answer 8

See Fig. 6. In its simplest form the VHF converter is no more than a mixer-oscillator with values adjusted for the higher frequency. The circuit selected shows a triode mixer, with its input circuit made wide-band to avoid the requirement for gang tuning and with its anode voltage adjustable so as to obtain best noise-figure from the particular valve in use. The oscillator is made tunable around the 50 MHz region, and is also fed to the mixer grid, using the VHF Colpitts circuit.

As a result, the incoming signal at L1 is mixed with

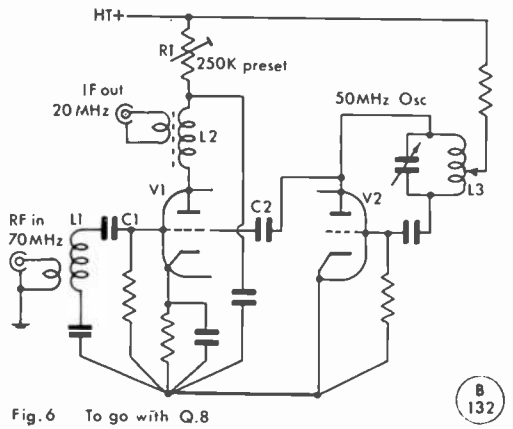


Fig. 6 To go with Q.8

Fig. 6. This arrangement could allow the local oscillator to "see" the Ae. terminal, so that in practice an RF stage would be used. L1 is tuned to mid-band. C1, 33 $\mu\mu$F, and C2, 10 $\mu\mu$F, are the important values. Effectively, R1 adjusts the anode potential of the mixer, V1, to give best noise performance at the available oscillator output. The valve could be a 12AT7, or similar double-triode.

the oscillator injection signal in the mixer; as the circuit is intended to cover the amateur 70 MHz band, this will result in a signal coming out at signal frequency *minus* oscillator frequency which can be collected from the link winding associated with L2. The critical values, other than the actual tuned circuits, are C1 and C2, which act as a potential divider and are chosen to give the best compromise from the point of view of mixer injection.

The only other point is that in the oscillator the two fixed capacitors which one would expect to see in series across the tuned circuit of a Colpitts circuit are in this case "invisible", the upper one being the anode capacity to earth and the lower one the grid capacity to earth.

(*10 marks*)

Q.9. (*a*) What is meant by the piezo-electric effect of a quartz crystal?

(*b*) Describe briefly the construction of a quartz crystal unit suitable for use in an amateur receiver or transmitter.

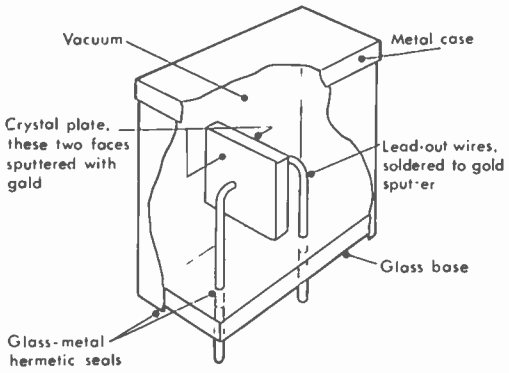
(*c*) Draw the circuit diagram of a crystal-controlled oscillator and name the components.

Answer 9

(*a*) *See* Fig. 7. The piezo-electric effect is the property of mechanical deformation under electrical stress and, conversely, of electrical output being given when mechanical deformation is applied. The effect is noted particularly in quartz and Rochelle salt crystals.

To utilise the effect, a quartz crystal is cut at very accurately controlled angles with respect to the main axes of the crystal and to a specific size and thickness: the cutting angle varies for different ranges of frequencies and for different temperature coefficients of the finished unit. The resulting piece of crystal shows very high mechanical resonance, with a Q in the region of 20,000 to even higher, and this is the property used in the oscillator.

(*b*) Fig. 7 shows a typical arrangement, with the



(a) Cut-away view of Crystal assembly

(b) Equivalent electrical circuit of 400kHz crystal.

Fig. 7 To go with Q.9 (B 133)

Fig. 7. Drawing of a metal-cased HC-6U or HC-36U crystal, such as may be found in modern equipment. It is sometimes made "plug-in", to go into a suitable base, or can be wire-ended for connection in circuit.

crystal fitted in a sealed can and the lead-out wires brought through a glass-metal seal. Various sizes are available, the bottom limit being to enclose a VHF crystal and its oscillator circuit in a TO5 transistor can! The crystal is sputtered over with gold, and the lead-out wires soldered to this at the "nodal points" to give the dual function of lead-out wires and the mechanical supports. The electrical equivalent circuit is also shown.

(*c*) *See* Fig. 8. The oscillator chosen is a FET version of the TATG circuit with the gate tuned circuit replaced by the crystal X1. R1 gives the gate a DC return and D1, a *fast* diode such as the 1N914 type, is a clamp which helps to reduce the oscillator generating too high a level of harmonic energy. The source is grounded, and the drain goes to a tuned circuit L1, C1. A few volts of HT are fed in through the 100-ohm resistor, and decoupled by the ·01 μF capacitor. Output is taken through the 100 $\mu\mu$F capacitor. HT should of course be fully stabilised for best results, and the FET could well be a type MPF102.

(*10 marks*)

Q.10. Describe a multi-band aerial suitable for use in a situation where space is restricted. Why is it preferable to use a single-frequency aerial?

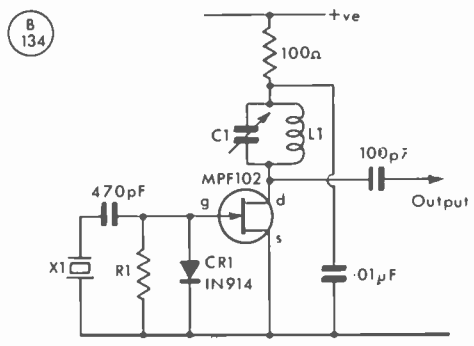
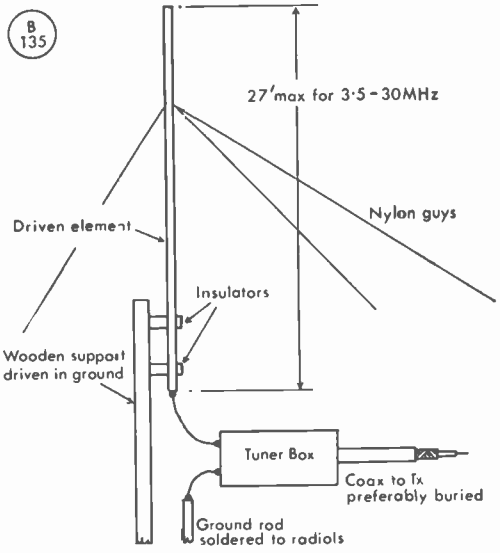


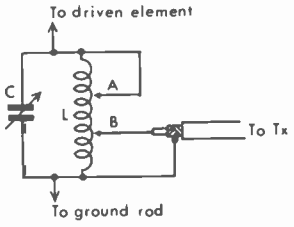
Fig. 8 To go with Q.9 (B 134)

Answer 10

For restricted space perhaps one of the most effective aerials is the vertical quarter-wave arrangement with the outer of the feeder grounded, or its near relation, the ground-plane. The grounded quarter-wave is chosen here, and illustrated in a multi-band form at Fig. 9. To cover 3·5 to 30 MHz, the vertical driven element should have a maximum length of about 27 feet in order that



(a) General arrangement (B 135)



(b) Tuner Box detail

Fig. 9 To go with Q.10

Fig. 9. See text relating to Q.10 for detailed discussion.

at the highest frequency used it may still give low-angle radiation; the driven element is mounted, on stand-off insulators, to a large piece of well-creosoted timber set in the ground, the base of the driven element being as near the ground as is practicable. A ground-rod is driven in at the base of the aerial and to it are connected a fan formation of radials. The minimum number of radials is generally reckoned to be four, each a quarter-wave long at the lowest operating frequency, but as many as can be fitted in should be used, even if many of them are shorter than the ideal; they should be buried an inch or so below the soil, not more, and all joined to the ground rod and thence to the tuner box. The circuit of the latter is shown at (*b*) in the diagram, and taps A and B should be adjusted for best VSWR at the operating frequency. C may be omitted, but is a great help in tuning on the lower two bands and could be 100 $\mu\mu$F maximum, variable. The tuner box should be well weather-proofed and the coaxial feeder should for preference be buried where it runs away from the aerial to the transmitter. This aerial can be made to show good VSWR—better than 2:1—on all bands 3·5 to 30 MHz.

However, it is preferable to use a single-frequency aerial, in general, because the shortened aerial of this nature will have higher Q and hence lower bandwidth on the one hand, and on the other a multi-band aerial may well display an unwanted resonance at an embarrassing frequency, possibly resulting in excessive harmonic radiation and consequent TV interference troubles—although it is fair to say that the design sketched is less prone to the effect than those types which involve a multiplicity of traps to obtain half-wave resonance on each band by decoupling off the outer sections of the aerial, when the higher frequencies are being transmitted; in this case a harmonic may be radiated by a lower-frequency section resonating on its third or other odd harmonic.

(*10 marks*)

SIMPLE SIDEBAND FOR TOP BAND

TEN-WATT DSB TRANSISTOR TRANSMITTER

R. S. HARRIS (G4BWZ)

SINCE first being licensed, the author has been trying DSB on 160m. with fair results, the advantages over AM being:—

(i) Higher talk power,
(ii) No need for high power modulator,
(iii) No requirement for bulky modulation transformers, etc.

Various published circuits have been tried, some with good success but have suffered from VFO stability problems, lack of good carrier suppression and lack of drive (in some transistor circuits).

PA balancing had been attempted with valve rigs, and then experiments with transistor PA's showed that unstable carrier suppression could be a huge problem. Balancing in an earlier stage using a symmetrical transistor circuit cleared up this difficulty.

The VFO is the heart of any rig, and pains taken with numerous PC boards being scrapped eventually ensured success—the conventional Hartley oscillator using an FET. The stability was excellent. The drift was measured to about ten cycles after one hour's continuous operation. Addition of another buffer stage cleared up the drive problem, and the circuit shown here was evolved.

Operation

VFO (Tr1) as stated is a Hartley Oscillator having excellent drift characteristics. The dust core is adjusted for 2 MHz with VC1 fully open. This should result in coverage of the whole band. The FET prevents much of the pulling noticeable in most bi-polar VFO's but since its output is taken directly from the tuned circuit a good buffer stage was required. This is also why the extra drive stage was incorporated before the balanced modulator. The buffer section Tr2-Tr3-Tr4 uses no tuned circuits so as to keep instability to a minimum due to mutual inductance effects. The collector of Tr4 is connected to the wideband transformer T1 which also serves as the phase-splitter for the balanced modulator.

Balanced Modulator

This uses the OC200 transistor Tr5 which is symmetrical, *i.e.*, when modulation is applied to the base the capacitance of the two junctions will vary symmetrically, thereby maintaining carrier suppression. There should be no need for a balancing capacitor provided the

Table of Values

Fig. 1. Circuit of DSB Transmitter

C1	= 1 μF, elect.	R6	= 270 ohms
C2, C4,		R7	= 820 ohms
C5, C7,		R9, R11	= 150 ohms
C8, C17	= 0·1 μF disc	R12	= 33 ohms
C3	= 5 $\mu\mu$F disc	R13	= 4,700 ohms
C6, C16	= 5 μF, elect.	R14	= 10,000 ohms
C9	= ·001 μF disc	R16	= 27 ohms
C10	= ·05 μF disc	R17	= 560 ohms
C11, C13,		RV1	= 1K var. linear, panel control
C14, C18	= 0·47 μF, poly	RV2	= 100 ohm pre-set for 50 mA in Tr7
C12	= 550 $\mu\mu$F disc		
C15	= ·01 μF disc	D1, D2	= 1N914
TC1	= 10 $\mu\mu$F preset	Z1	= 5,6v. zener
VC1	= 50 $\mu\mu$F var.	Tr1	= MPF102
VC2,		Tr2,	
VC3	= 500 $\mu\mu$F var. BC type	Tr3	= BC107
R1	= 220,000 ohms	Tr4,	
R2	= 390 ohms	Tr6	= BFY51
R3, R8	= 22,000 ohms	Tr5	= OC200
R4, R10,		Tr7	= BD123
R15	= 1,000 ohms		
R5	= 15,000 ohms		

TABLE OF COIL DATA

L1	= 80 turns 30g. enam. close-wound, tap 25 turns from cold end.
L2	= Primary: 30 turns 30g. close-wound; secondary 8 turns at cold end. L2 across Cq.
L3	= Primary: 40 turns 30g. tapped 10 turns from cold end, close-wound; secondary, 8 turns 22g. close-wound over cold end primary.
L4	= PA tank: 35 turns 22g. one-inch dia., taps at 26th and 32nd turns.
T1	= Primary: 21 turns 30g. on ferrite-pot core, 12mm. o.d., 6mm. i.d. x 3mm. high; secondary, six turns bi-filar wound.

Note: L1, L2, L3 are on ⅜in. Aladdin or similar dust-cored formers.

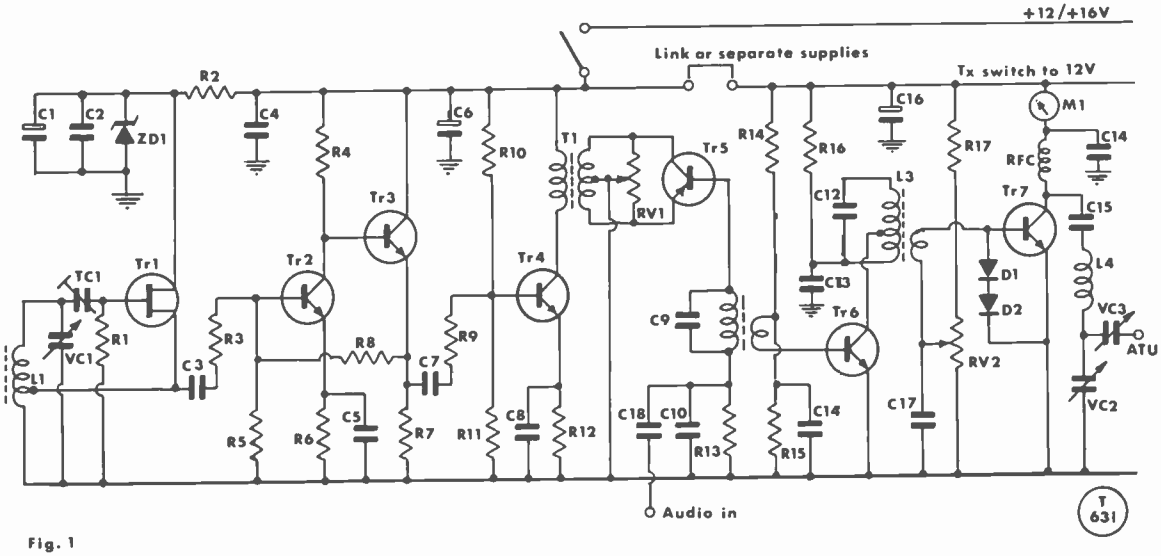


Fig. 1

Fig. 1. Circuit of the Sideband Tx for Top Band

layout is kept symmetrical. This method provides better carrier suppression than the usual "matched" diode arrangement. The DSB output is now fed to L2 which is tuned so as to attenuate any harmonics generated in the balanced modulator stage. The link winding on L2 is connected to the driver stage.

Driver Stage

This is a conventional amplifying arrangement, Tr6, providing more than enough drive for the PA. The drive coil L3 has a reasonable Q adjustable by the tap on it.

PA Stage

Diodes D1 and D2 prevent overdriving the PA Tr7 (probably to destruction!) which is linear in operation. Layout of the PA is quite important and it is not suggested that the transistor uses the outside chassis as the heat sink but an internal screen connected to the chassis (*see* Fig. 2), so as to prevent any stray coupling between output and input which could start oscillation in the PA (again destruction). An L-network output fed to an ATU provides good matching for the BD123. Note VC3 is insulated from chassis.

Tuning Up

Plug a dummy lead of 75 ohms into the output at the L-network. Set TC1 to half mesh and depress net switch. With L1 core full in and VC1 to half-mesh, the signal should be found somewhere on Top Band. If not check wiring and supplies. When it is found, reduce value of TC1 until oscillation just stops then increase it by half-a-turn. Adjust core in L1 for full coverage then seal VFO. Next set wiper of RV2 to earth and apply voltage only to the P.A. Adjust RV2 for 50 mA standing current. Then apply supplies to the whole transmitter. Apply an audio tone or connect junction of L2 and R13 through a 4·7K resistor to the positive line. Set RV1 to mid-travel. Peak L2 for a rise in PA current at highest S meter reading on station receiver. Now set VC3 to

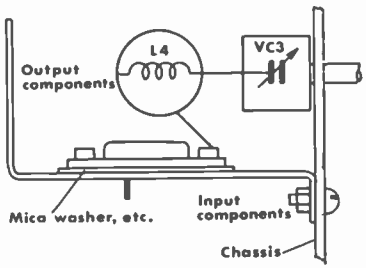


Fig. 2

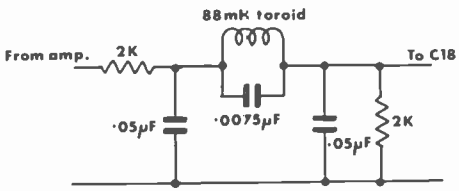


Fig. 3

Fig. 2, Fig. 3. Circuitry as discussed in text

full mesh and peak VC2 for best signal strength or voltage on an RF voltmeter connected across the 75-ohm dummy load. Next peak L3, then VC2 again. Reduce VC3 in steps, peaking VC2 every time until 10-watt input is achieved.

Next remove tone or resistor connection and dip PA current by RV1. Modulation now applied to C18 will produce output.

Modulation

A simple 4-transistor amplifier could be used, but some kind of limiting in audio frequency should be incorporated to limit sideband range to about ± 3 kHz. The circuit in Fig. 3 limits very nicely. Care should be taken not to overmodulate.

Layout

This is not very critical except that the balanced modulator stage should be kept as physically symmetrical as possible so as to minimise stray capacitance, which could result in lack of carrier suppression.

Screening is important. The components before the balanced modulator were all built into a diecast box and the PA must be fully screened.

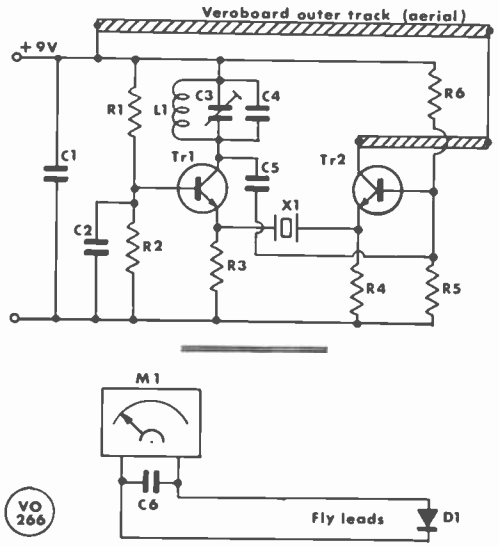
TEST OSCILLATOR FOR VHF

AND AN RF SNIFFER

by R. REW (G3HAZ)

THE circuitry shown herewith is for items for lining up and testing VHF converters up to 23 cm., and is from notes first appearing in the *Newsletter* of the Midland Amateur Radio Society (issue for December '74).

First, the Test Oscillator/RF Generator: This can be mounted on a small piece of *Veroboard*, 0·1 in. pitch, about 1¾ x 2in., layout being as suggested by the circuit diagram. The transistors to use are the BC107, or



Values for the Test Oscillator/RF Sniffer can be : C1, C2, .001 μF ; C3, 10 μμF trimmer ; C4, 10 μμF silver mica ; C5, 47 μμF s/m ; C6, 220 μμF, disc ; R1, R6, 15K ; R2, R5, 2.2K ; R3, R4, 100 ohms ; Tr1, Tr2, BC107 ; Coil, 5 turns 20g. to ¼-in. dia. And for the Sniffer, D1 is 1N4148 or similar ; M1, 0-500 μA meter ; and X1, 14 MHz crystal (*see text*).

any similar with an Ft better than 100 MHz. Suitable values are given in the caption.

The crystals can be either a 14 MHz type on its 5th-overtone, or one of those marked for 42 or 72 MHz working.

Setting up the Test Oscillator is by checking against a receiver covering one of the VHF bands, adjusting C3 for take-off and starting. Actually, this unit was originally intended as a "signal generator" for the author's work on 23 centimetres, so that if it is to be used mainly on two metres or 70 centimetres, it will probably need to be in some sort of screened box, to give a weak-signal source.

RF Sniffer

This is a simple device, involving a 500 microamp. meter and a diode, such as a IN4148 mounted on its own leads across a loop of stiff wire about an inch long, spaced a quarter-inch or so. Any RF lurking about will be indicated on the meter—depending, of course, on the coupling between the circuits. This device is not frequency-conscious, responding only to an RF field.

VHF HANDBOOK FOR RADIO AMATEURS

The name of William Orr, and the callsign W6SAI, are synonymous with authorship of excellent articles on a wide variety of aspects of Amateur Radio. In the latest edition of THE VHF HANDBOOK FOR RADIO AMATEURS he has collaborated with Brier, W9EGQ, to produce a most comprehensive survey of the VHF field—from the early experiments of Faraday and Marconi, through the first amateur transmissions in the early 1900's, up to the present era of moonbounce and amateur satellite communication.

There is a happy combination of the practical with the theoretical here. The early chapters on VHF tropospheric and ionospheric propagation bring the reader right up-to-date with the latest theories developed from space probe observations. Succeeding sections translate into hardware the most recent advances in components and techniques for use at VHF. Of particular interest to the U.K. reader are the chapters devoted to the theory and practice of FM and the operation of repeaters. VHF antennae, from both the design and construction points of view, receive extensive treatment and the authors have included sections dealing with the latest solid-state components and circuitry, culminating with constructural details of converters and transmitters to which they are applied, together with the appropriate VHF test equipment.

This book, of sixteen chapters and 336 pages, is well illustrated with photographs and diagrams and can be confidently recommended as a valuable addition to any library of VHF expertise. It is published by Radio Publications, Inc., in the United States, and is available from Publications Dept., Short Wave Magazine, 55, Victoria Street, London, SW1H 0HF, at £2·65, post free, immediate delivery from stock. *H.H.D.*

YAESU FR-50B MODIFIED FOR TOP BAND

B. A. M. HERBERT (G2WI)

A RECEIVER of this type having come into the writer's possession, and being minus "Top Band," it was decided to modify it, utilising the switch position marked "WWV" (or "AUX") for this purpose.

A survey of the circuitry and physical layout showed that the tuned circuits in the grid of the RF stage and of the mixer consisted of two coils in each case, one coil serving for 80 metres and 40 metres, the other for 20, 15 and 10 metres and also for the WWV (AUX) band. The resonance at these various frequencies is achieved by switching in a variety of padders and capacitors.

Circuitry

With the bandswitch in the "AUX" position the grid coils in use were as for 20/15/10 metres; it was surmised that for 160-metre operation the 80/40m. coils would be a better choice. It is a simple matter to disconnect the 20/15/10-metre coil from the "AUX" contact (one snip with cutters!) and almost equally simple to bridge the isolated contacts across to those on the 80/40m. coils. The appropriate transfer was also made on the switch wafer which connects the aerial coupling coils.

The Grid Dip Oscillator was now brought out and it was speedily determined that about 230 $\mu\mu$F needed to be added to the padding capacitances already in place. These values were soldered in. The two tuned circuits now peaked over the whole of Top Band. Attention was then turned to the Local Oscillator circuitry. A whole lot of things were learnt quite quickly!

Before attempting any changes the coil slug was run through its complete range (the Osc. is designed to work at about 15 MHz) and it was a surprise to hear Top Band signals at one setting! Admittedly they were

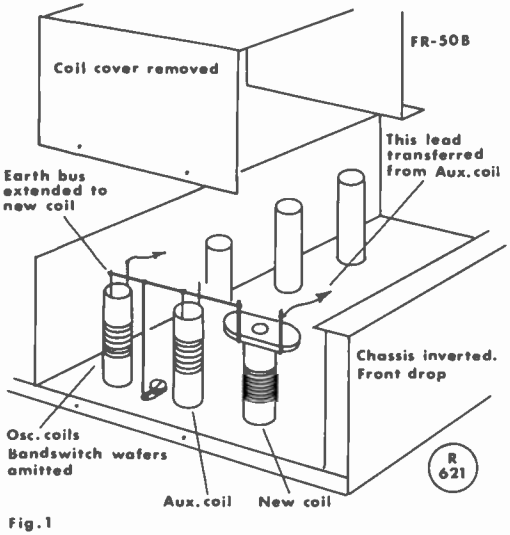


Fig. 1

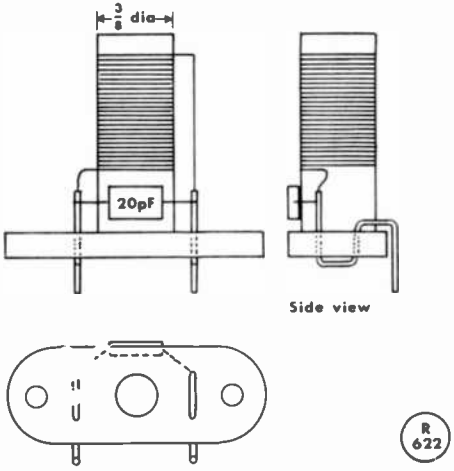


Fig. 2

weak but undoubtedly there! The mathematics of quite how this was achieved with a double-superhet circuit was never worked out—but it promised well!

It was decided to wind a new oscillator coil which would resonate as required, with only a small amount of padding, and so afford full coverage of Top Band. Further calculations gave the answer that the coil would need to be 45 turns of 38 gauge enamelled copper wire close-wound on an Aladdin ⅜in. former, with 20 $\mu\mu$F in parallel.

New Coil

This coil was fabricated (*see* Fig. 2), a foundation of *Sellotape* (sticky side outwards) made the securing and retention of the winding easy, and the same material was used to cover it neatly. The soldering lugs were fashioned out of 16g. wire and the 20 $\mu\mu$F capacitor also soldered into place.

When the Oscillator coils cover is removed (held by four screws) the "Aux" coil will be found nearest the edge of the chassis and the front panel. The earth busbar for this coil and its neighbour is extended by soldering on about one inch of 16g. wire; one of the soldering tags on the new coil is sweated on to the earth busbar, and the other connection on the "AUX" oscillator coil is transferred to the new coil. Thats all! The coil shielding can now be replaced.

On switching "on" calculations were vindicated—there was Top Band roaring in at full-strength! The band was covered in about 350 of a 500-division scale.

The Oscillator padder for the "AUX" position can readily be identified and a slight adjustment to this allowed 1800 kHz to be placed on zero; 2 MHz then fell at about the 350 mark. For the purist it would be simple to alter the Oscillator padding capacitors (the fixed ones) to get 1800 kHz on zero and 2 MHz on either 200 or 400—it's a matter of individual choice.

This leaves only one trifling adjustment—the "Preselector" control should be set at mid-position, then identify the variable padders for the respective grid circuits and peak these with the receiver tuned to 1900 kHz. The "preselector" will now peak the signals anywhere in Top Band

VHF BANDS

A. H. DORMER—G3DAH

Oscars

Oscar VI: This satellite continues to function well after its planned life span—it has now completed over 10,000 orbits! It is still being abused by some European stations who are running excessive power with high gain antennae, and G2BVN, *QTHR*, should be advised of persistent offenders so that action may be taken to draw their attention to the schedules and power limitations. The satellite should be used for communication purposes only on Mondays, Thursdays and Saturdays (ascending mode) and Sundays (descending mode). Here are a few predictions for February:—

Date	Orbit No.	Time GMT	Bearing
Feb. 3	10531	1557·05	287·3°
Feb. 6	10567	1256·53	242·3°
Feb. 8	10593	1446·45	269·7°

Oscar VII: All systems are still "Go" with this satellite, and there has been a significant improvement in the sensitivity of the Mode "A" link which is now repeating input signals at just about the same strength as on Oscar VI. However, the 70 cm. beacon is still a bit on the blink, and the power output is sometimes down to a few milliwatts, although well-equipped stations are still able to copy, even at this low level. The sensitivity of the Mode "B" repeater receiver has been improved, and the e.r.p. required for access should *not* now exceed 100 watts. Access to Mode "A" is possible with 100 watts e.r.p.—any higher power will activate the AGC, de-sensitise the repeater and is to be eschewed.

Although the orbital parameters of Oscar VI have been well established, there still appears to be some divergence of opinion on exact data for Oscar VII. The latest figure we have is 114·9450 mins. as the period time, which gives an orbital increment of 28·736°W. The inclination is 101·73°. Using these figures, here are a few predictions for February:

Date	Mode	Orbit No.	Time GMT	Bearing
Feb. 3	B	1000	1205·35	231·4°
Feb. 6	A	1038	1253·28	243·3°
Feb. 8	A	1062	1052·07	213·0°

Later orbits may be calculated with a reasonable degree of accuracy by deducting 115 minutes from, and adding 28·74°W to, each successive orbit. For longer term prediction, deducting 6·24 minutes and 1·50 from any reference orbit will give the parameter for a pass 25 orbits later (two days).

During December, 1974, the operating schedule for Oscar VII prescribed Mode "A" (2/10m.) for odd days and Mode "B" (70 cm./2m.) for even days of the year continuously. This has now been changed in that, once again, Wednesday passes are reserved for special experiments and observations and should *not* be used for ordinary communications purposes. The even and odd days of the year rota still applies as far as the operating mode is concerned, *i.e.*, January 31 is an odd day and Mode "A" is in operation but February 1 is the 32nd day of the year and, therefore, Mode "B" applies.

It is interesting to note that Oscar VI and Oscar VII can now "see" each other, and that by the end of this month (January) will have caught up in space and time. It is already possible to hear stations calling into Oscar VI on 2m. while waiting oneself for the imminent downlink signal from Oscar VII on Mode "B." It appears possible, therefore, that a transmission on 70 cm. would be translated by Oscar VII into a two-metre signal which could be received by Oscar VI and re-transmitted on 10m. No reports have come in confirming this possibility, but it is perhaps early days yet. It may also be noted that when Oscar VII is in Mode "A" and Oscar VI is also on, two signals will be received around 29·475 MHz, so you should indicate which repeater you are using!

Last month, we dealt with the repeater operations of Oscar VII since they are the most important from the average amateur point of view, and we thought that this time we might have a look at the other facilities which are available. A comprehensive Command system operates with a decoder in the satellite giving control of 35 different functions appropriate to the operation (and non-operation) of the various repeaters, beacons and on-board experiments. Thus repeaters may be commanded into the appropriate mode for the day or for the circumstances prevailing (which might dictate that one of the emergency modes should be activated) or that they be switched on or off, while telemetry can be passed to any of the beacons and the Codestore facility brought into use. This latter is a storage unit which is capable of storing and repeatedly transmitting 18-word, or 896 bit, CW messages which are loaded into the store from ground control stations. The RTTY telemetry encoder amplitude modulates the telemetry beacons on 29·50 MHz (200 mW) and 145·97 MHz (200 mW) and frequency shift keys the beacon on 435·1 MHz (300-400 mW) as selected by ground control. The Morse telemetry encoder and Codestore message unit directly key these beacons, again as selected by ground control.

The two telemetry systems are designed to work with simple ground terminal equipment. The first system telemeters 60 parameters in 850 Hz shift, 60 w.p.m., five-level Baudot teletype code to permit print-out on standard RTTY equipment in a format which is suitable for processing by a small digital computer. The second system telemeters 24 parameters as numbers in standard Morse code at a speed of around 20 w.p.m. Normally, the 10-metre beacon will carry the CW information and the 2m. beacon the RTTY messages, but these procedures may be varied from the ground. Safeguards are incorporated in Oscar VII which can be brought into operation in the event of failure of any of the component parts. For example, should command decoder A fail, then decoder B may be swiftly brought into operation.

All in all, then, this is a pretty sophisticated piece of amateur satellite equipment of which designers and operators may be proud and all being well, which we should be able to use for many a year.

For several operators, prefix scores are

70 CENTIMETRE ANNUAL TABLE
Final placings at December 31, 1974

Station	Counties	Countries	Total
G3NHE	56	11	67
G8EOP	42	10	52
G4AGE	42	8	50
GD2HDZ	38	7	45
G3DAH	35	9	44
G5DF	38	6	44
G8FMK	34	3	37
G3XDY	21	8	29
G3SHY	23	5	28
G8GNE	23	3	26
G3BW	22	4	26
G4BMM	19	4	23
G3FIJ	15	4	19
G4AEZ	14	3	17
G8HBQ	12	3	15
G3OHH	12	2	14
G8ECO	12	2	14
GM3ZBE	4	6	10
G8GHZ	9	1	10
G2AXI	9	1	10
G3AHB	7	1	8
G8FUI	5	2	7
G4DNJ	5	1	6
G8BGR	4	1	5
G3EKP	2	2	4
G8BPJ	1	2	3
GW8FKB	1	1	2
GW8BXQ	1	1	2
GI8EWM	1	1	2
G8GXE	1	1	2

TWO-METRE ANNUAL TABLE
Final placings at December 31, 1974

Station	Counties	Countries	Total
GW8FOL	81	16	97
GD2HDZ	80	13	93
G4CZP	79	14	93
G3NHE	74	18	92
GW8FKB	77	10	87
G3XDY	72	12	84
G8EOP	71	13	84
G5DF	66	16	82
G3DAH	63	18	81
GM4CXP	68	12	80
GW3KGD	64	15	79
G3BW	68	11	79
G4AGE	67	11	78
G8GHZ	67	10	77
GW8BXQ	60	13	73
G8HBQ	61	9	70
G3OHH	56	11	67
G3AHB	55	10	65
G4DHF	56	9	65
G8DGR	52	11	63
G8FWB	52	10	62
G8HHI	52	10	62
GM3ZBE	48	13	61
GI8EWM	52	9	61
G8GNE	49	12	61
G8GGP	50	9	59
GW8HVP	51	8	59
G4AEZ	46	12	58
G8ECO	49	9	58
G3FIJ	44	13	57
G4BMM	45	11	56
G8CBU	48	7	55
G8HQA	37	7	44
G8FUI	35	8	43
G8GLS	36	6	42
G8BBP	37	5	42
GW3XJQ	31	10	41
G2AXI	32	8	40
G4DNJ	32	5	37
G8GXE	29	5	34
G3SHY	27	6	33
GW4BXE	20	11	31
G3FKP	29	2	31
G8HYH	29	4	31
G8FMK	27	2	29
G3SXK	21	6	27
G8BPJ	23	2	25
G3EKP	15	4	19

FOUR-METRE ANNUAL TABLE

Final placings at December 31, 1974

Station	Counties	Countries	Total
G3NHE	56	6	62
G3DAH	51	8	59
G3OHH	46	7	53
G5DF	44	7	51
GD2HDZ	41	6	47
G3FIJ	33	4	37
G4AGE	29	4	33
G3XDY	29	4	33
GM3ZBE	28	4	32
G3EKP	21	7	28
G2AXI	21	3	24
G3SHY	15	3	18
G4AEZ	15	2	17
GW4BXE	12	2	14
G4BMM	8	2	10

now around the 28-30 mark in both modes but initiating and completing contacts is still being made difficult by the selfish habit of the power-crazy few who insist on running umpteen watts into multi-multi element beams. G3BHW can access Oscar VII with 11 watts into a 14-ele array on 70 cm., but this is perhaps excpetional, and cannot be achieved on the more distant orbits, but it is an indication that 100 watts e.r.p. is all that is required for reliable access to any orbit. Similarly, G3COJ finds he can access a Mode "B" overhead pass with as little as one watt to a helix, although he has had to up the power somewhat to get his 25 countries in the log. He is getting results into the U.S. after 2300z when the high power DL's are out of range.

Finally, useful gen on both Oscar satellites may be gleaned from the special Oscar nets which operate on 3780 MHz at 1015z each Sunday morning, stage-managed by G3IOR, and the 144·28 MHz net operated by G8CSI on Sunday evenings at 1930z.

We shall be very pleased to receive details of your results and gear in use. Good luck!

Contests

Results: The March & District ARS demonstrated once again the excellence of their contest gear when they followed up their success in the VHF NFD event with a win in the October VHF/UHF contest, in spite of the fact that they were operating on 432 MHz and 1296 MHz only. A lead of some 5000 points over G3WGD/P, Wiltshire, is pretty conclusive. G3JVL (Hayling Island) was the leading fixed station operator, scoring 64,000 points from 70 cm. and 23 cm. operation.

GW3UCB/P had a convincing lead over G3NHE in the November 144 MHz CW contest and were also the leaders in the 432 MHz SSB event. The latter attracted a smallish entry, hardly surprising perhaps in view of the date towards the end of the year when conditions are unlikely to be anything like their best, and it is to be hoped that the contest committee will find a space for a follow-up, perhaps during the summer or early autumn of this year, when the growing number of exponents of this art will have another chance to demonstrate the superiority of this mode over others.

Forthcoming Events: January 18/19, 144 MHz CW; January 19, 70 MHz CW; February 2, 432 MHz Open.

Annual Calendar: It may be noted that the contest calendar for 1975 eliminates the 432 MHz July Open and replaces it with one in November, and deletes the July 70 MHz Open. No Cumulatives have yet been announced for either of these two bands.

VHFCC Awards

During 1974, 30 readers gained VHF Century Awards. Of these, 29 were for operating on 2m. and two for 70 cm. work, and before you correct the arithmetic, be it noted that G4AGE claimed for both bands. This compares with a total of 27 claims for 1973 and 44 for 1972—a bumper year.

Although the rules governing the issue of this Award are published at frequent intervals, we give them again here for the benefit of new readers.

To qualify for membership you must have worked, and got QSL cards for, 100 different stations on either 4m., 2m. or 70 cm. This does not exclude you from claiming the Award for all three bands provided you have the 100 cards for each. All contacts must have been made from one fixed QTH, although it is permissible to claim for QSO's with mobile and portable operators from your home location. This means that if you move QTH you may have to start collecting cards all over again, but this is just hard luck! Should your callsign change during the period you are amassing your cards, for example from G8 to G4, this should be noted on your claim and a mix of cards will be accepted.

A list of the 100 stations worked (not cards), showing date, callsign and location, should be sent to: "VHF Bands," *SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ* together with details of your station equipment and a brief resumé of your career as a radio amateur. You will then be asked to forward six QSL cards, chosen at random from your list, for verification purposes, and if these are all in order they will be returned to you with the Award. Quite simple really, isn't it?

Although 231 Awards have been issued for Two Metres, there have so far been only 18 for 70 cm. and seven for 4m., and this in no way reflects the growing activity on these bands. We should welcome, therefore further claims for "Centuries" on 4m. and 70 cm., representing as they do, a greater challenge and achievement than is the case for 2m. where the amateur population is so much higher.

Finally, we announce the Award of two-metre Certificate No. 231 to G8HUU, Paul Newman of Thame, Oxon. He runs a Pye Vanguard with 28 watts input of AM or phase mod. to an 8-ele. Yagi at 40ft. Rx is a Sentinel pre-amp into an RA-1.

Hic et Ubique

Four Metres: GB3SU, the erstwhile Sheffield beacon, has now been moved to a site 3 km. SE of Buxton, at Harpurhill, Derbyshire, a location some 1,000ft. a.s.l. The move was completed over the weekend of December 13 and, with the exception of a transformer fault in the PSU, has been operating perfactly since. Certainly, the signal is much improved in the South-East, and is reported as 5 & 9 + by G3OHH in Mow Cop as against 5 & 8 previously. In Herne Bay, the average is 5 & 5 against the earlier 5 & 3 with QSB to noise level. The new Sussex beacon, GB3SX, was received *for the first time* by G3OHH at 559 on January 5. Admittedly, conditions were a bit up, but the sooner the horizontal dipoles are in position the better, one would think, as the ground plane is obviously not so hot.

A newcomer to this band is G3ONX (Tuffley, Glos.). He runs the 4m. version of the DL6HA converter into a 6-ele. beam at 20ft. and although he only has some 5 watts of SSB available at the present time, this is shortly to be increased to 25 watts which should make him a good signal at DX range. He is QRV most evenings and weekends. Another newcomer to 4m. is G3SXK, who is putting out a good signal on the band on Sunday mornings. G3RSI (Camberley, Surrey) now runs 40 watts to a 4-ele. beam at 400ft. a.s.l. and G3XBY of Hatton, Warks., has increased his e.r.p. somewhat by a monster 8/8 slot-fed Yagi. He says that it is fascinating to watch it in a high wind when the elements, the booms and the mast all bow in different directions! In Wales, GW3XJQ is preparing to come on 4m. with a low band Ranger and provide thereby a signal from West Glamorgan.

Up in Lanarkshire, GM3MXN and GM3NRP are both operational and are looking for DX contacts on Sunday evenings from 2230z onwards. GM4CXP in Roxburgh also has plans well advanced for coming on with 10 watts of AM/CW. GM3ZBE in Inverurie now has the 4m. beam installed in such a way that he no longer has to go on to the roof to turn it every time there is an aurora! He has found 70 MHz to be the most interesting during 1974, and noted an increasing amount of activity. He runs 100 watts on the band.

Two Metres: GB3MH, the Malvern Hills repeater, was brought into service early in December and has been radiating a good signal on 145·775 MHz, input on 145·175 MHz. GB3SN in Hampshire is still transmitting a steady carrier and callsign pending completion of the installation at Four Marks.

Ex-GW8IOL is now GW4DRR and is on 2m. from Anglesey. He reports an EI net on 144·2 MHz, or thereabouts, every Sunday morning at 1200z and this is confirmed by EI7D. Over in Haverfordwest, GW8HVP hopes to have the QQV06-40A back in service again shortly, and this will give him 150 watts to feed the multi-element quad antenna which he proposes to erect. He and GW4CBR are planning a comprehensive series of tests on quad antennas during the Spring, and we shall look forward to hearing from them with some recommended designs for this type of radiator, which seems to be arousing increasing interest for VHF work. GW3KGD, also in Haverfordwest, is reckoning on pushing up his score for the 1975 VHF Tables with an FT-250 prime mover and a Europa transverter, which should give him some 60 watts output into the 6-ele. beam at 210ft. a.s.l. and will make him an attractive target for those looking for Pembroke.

G8JRZ should be on 2m. shortly with an FT-220 and a 5-ele. Yagi. He would particularly welcome SWL reports, to 42, Mora Avenue, Chadderton, Oldham, Lancs. OL9 0EJ. G4DLU (Banbury) is certainly not wasting much time—he has had 600+ QSO's on the band. He runs 15 watts from a QQV03-20A and uses an 8 MHz VFO. The 7-ele. Yagi at 15ft. puts a good signal into the North of England—the 425ft. a.s.l. QTH helps, of course. G8JAJ (Cheltenham) is working against the odds in that he only has 500 mW of AM to an indoor 6-ele., but his Parabeam has now arrived and he proposes to feed that with some SSB, which should help. He is working

THREE BAND ANNUAL VHF TABLE

Final Placings, December 1974

Station	FOUR METRES Counties	FOUR METRES Countries	TWO METRES Counties	TWO METRES Countries	70 CENTIMETRES Counties	70 CENTIMETRES Countries	Points
G3NHE	56	6	74	18	56	11	221
G5DF	44	7	66	16	38	6	187
GD2HDZ	41	6	80	13	38	7	185
G3DAH	51	8	63	18	35	9	184
G4AGE	29	4	67	11	42	8	161
G3XDY	29	4	72	12	21	8	146
G8EOP	—	—	71	13	42	10	136
G3OHH	46	7	56	11	12	2	134
G3FIJ	33	4	44	13	15	4	113
G3BW	—	—	68	11	22	4	105
GM3ZBE	28	4	48	13	4	6	103
GW8FOL	—	—	81	16	—	—	97
G4CZP	—	—	79	14	—	—	93
G4AEZ	15	2	46	12	14	3	92
GW8FKB	—	—	77	10	1	1	89
G4BMM	8	2	45	11	19	4	89
G8GHZ	—	—	67	10	9	1	87
G8GNE	—	—	49	12	23	3	87
G8HBQ	—	—	61	9	12	3	85
GM4CXP	—	—	68	12	—	—	80
G3SHY	15	3	27	6	23	5	79
GW3KGD	—	—	64	15	—	—	79
GW8VXQ	—	—	60	13	1	1	75
G2AXI	21	3	32	8	9	1	74
G3AHB	—	—	55	10	7	1	73
G8ECO	—	—	49	9	12	2	72
G8DGR	—	—	52	11	4	1	68
G8FMK	—	—	27	2	34	3	66
G4DHF	—	—	56	9	—	—	65
GI8EWM	—	—	52	9	1	1	63
G8FWB	—	—	52	10	—	—	62
G8HHI	—	—	52	10	—	—	62
G8GGP	—	—	50	9	—	—	59
GW8HVP	—	—	51	8	—	—	59
G8CBU	—	—	48	7	—	—	55
G3EKP	21	7	15	4	2	2	51
G8FUI	—	—	35	8	5	2	50
GW4BXE	12	2	20	11	—	—	45
G8HQA	—	—	37	7	—	—	44
G4DNJ	—	—	32	5	5	1	43
G8GLS	—	—	36	6	—	—	42
G8BBP	—	—	37	5	—	—	42
GW3XJQ	—	—	31	10	—	—	41
G8GXE	—	—	29	5	1	1	36
G3FKP	—	—	29	2	—	—	31
G8HYH	—	—	27	4	—	—	31
G8BPJ	—	—	23	2	1	2	28
G3SXK	—	—	21	6	—	—	27

Notes:

1. This is the final Table for 1974.
2. From January 1, 1975 the new county organisation for England and Wales will be used in the compilation of the Tables for 1975. Throughout 1975, Scottish counties will remain unchanged for the purpose of this Table.
3. Claims should be sent to: "VHF Bands," *SHORT WAVE MAGAZINE, BUCKINGHAM, M.K18 1RQ* starting now.

for his full ticket and is to be congratulated on his initiative—he is only 14 years of age! We were sorry to learn that G3XDY lost his antennae in the winter gales and that that fact, and a change of job location, will keep him off the 2m. air for some time. He will try and do a little /P operating though.

Seventy Centimetres: G3BW up in Whitehaven has been plugging away getting some 70 cm. gear operational and is reaching finality with it. The final set-up will be a *Microwave Modules* transverter driving a 2C39A into a 4CX250B with a 46-ele. Multibeam on the end—which should make it very much easier to work Cumbria than it has been up to now! In Enfield, G4AEZ now has SSB available from a DJ6ZZ transverter (glad to know that *someone* can make them work!) into a 2N4430 and BLY98 which gives him about 5 watts of RF. The potential of SSB on this band was demonstrated to him when he worked G4BEL at 50 miles with only 40 mW of output!

Twenty-Three: GM3ZBE in Inverurie has completed his tripler (2C39A) for this band and expects to be QRV shortly as he has the rest of the gear ready to go. We are pleased to welcome G8AAY (Wimborne, Dorset) to the band and also to get a substantial claim for the All-Time Table from old-timer G3OBD in Poole, Dorset. His four countries and 24 counties include G, F, GC and GW (Monmouth and Brecon). He mixes 1152 MHz and 144 MHz from a Liner in a 2C39A and this in turn drives another 2C39A with 1,000 volts on the anode to 150 watts input. The Rx is a radial cavity mixer with a two-stage BFR90 pre-amp into an AR88 tuning 24-26 MHz. The antenna comprises two, 26-ele. loop quads, to the G3JVL design, with a power divider. The All-Time 23 cm. Table will be published again next month.

Three-Band Annual VHF Tables

We are very pleased to congratulate Martin Dann, G3NHE of Sheffield, on his leading place in these Tables with an outstanding score of 221, the first double century ever achieved. His thus repeats his success of last year. He adds to this feat by retaining the leading place in the 70 cm. Table and also heading the 4m. list. GW8FOL, now GW4DRR, retains his lead in the Two-Metre Table.

It is not easy to assess the reason for the drop in the total number of Table claims. It has been suggested that the arrangement is "unfair" to the G8/3 who is denied the use of 4m., and that separate Tables should be established for Class-B licences, but this rather misses the point—you could still head the 2m. or 70 cm. list in competition with Class-A operators, and one would hope that the element of competition might encourage those who do not, or cannot, operate on 4m. to take steps to ensure that this band becomes available to them!

Deadline

Deadline for the March issue is February 7 so please get all your notes and claims in by then. We shall be starting off the new Annual Tables with the next issue, but claims go from January 1 to December 31 as usual. Send it all to "VHF Bands," *SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.* That's it for now so cheers and *73 de G3DAH.*

THE MONTH WITH THE CLUBS

By *"Club Secretary"*

(Deadline for March issue: February 6)

ONCE more the time comes round for a "Clubs" piece—the first one to be tackled by your conductor for 1975, although of course it will be the second one to readers. As one might expect, a few points fall to be mentioned. Last time out, as the tailpiece indicated, some eight unfortunate Club letters were in a packet of Christmas mail which went wildly astray—involving telephoning around in a frantic effort to get at least a mention into the piece and the secretary data into the Panel—quite a kerfuffle indeed.

For this time, space is once more at a premium, just when, partly because of that situation, we have a bumper crop to take in. This being so, it has been decided that the only way to "make" space is to revert to the old "Short Notices" box, in which appear basic data are given. So . . . if you can't find what you expect in the body of the piece, look at the Short Notices panel. Wherever they appear, each Club mention will result, as always, in an entry in the Panel of Secretaries.

Southerly

A change of arrangement is noted at Mid-Herts.—there will be no more Thursday meetings in 1975, and instead the third Monday in each month is being booked at the Civil Centre, Prospect Place, Old Welwyn.

Having, as so many groups do, held their AGM in January, we could hardly expect the Edgware people to be too sure of their bearings. The booked nights are and will continue for the moment to be the second and the fourth Thursdays, at 8.0 p.m. for 8.30, at Watling Community Centre, 145 Orange Hill Road. It is generally the routine that the initial session in a given month is the "formal" do, with a speaker or films or whatever, while the second one is informal.

The February 15 date for Crystal Palace is the AGM, at Emmanuel Church Hall, Barry Road, London, S.E.22.

Silverthorn have so much for members to put in their *Newsletter* this time that they have no room to give details of the programme! However, they are known to assemble on a weekly basis, and the venue is Friday Hill House, Simmons Lane, Chingford, London. E.4, where they have quite a nice set-up going.

Not only do they quote all the details about the venue in their *Newsletter* at Southgate, but one notes in addition that if one contacts the compiler of said newsletter, intending visitors can be fixed up with a map to help them home in—a good idea, this one. It is always the second Thursday of the month with this group, the Hq. address being the Scout Hut, Wilson Street, Winchmore Hill, London N.21. Looking at the newsletter, one cannot help wondering who was the subject for the radio amateur cartooned on the newsletter front cover?

While he hoped he was not too late, the Maidstone YMCA Secretary was in fact out of luck last month. This Club has a very nice set-up indeed, which can be seen by attending the Sportscentre in Melrose Close, any Friday evening. The general form seems to be for two "Beginners" nights of R.A.E. and Morse, all informally done, the other two being set aside for lectures of one sort and another. The class nights, then, are February 7 and 21, with the 14th and 28th given over to lectures, the former being for G3VTT on the curing of Breakthrough and Interference, the latter being for a talk about Slow Scan Television.

The Echelford offering currently to hand is rather more concerned with Christmas than February—but they found a corner to indicate, provisionally, that February 10 is scheduled for a BBC type to come and talk microphones, while the 27th should be equally interesting—it has G3KKQ distilling for the benefit of all the lore of the good operating, whether in contests, the DX chase or whatever.

Acton, Brentford & Chiswick have a secretary who has been serving them up with the sort of meetings they want ever since your conductor started this piece. This time it is G3PZK, to talk about and demonstrate the FT-75 in the mobile context, on February 18, at 66 High Road, Chiswick, London, W.4.

Although our Cray Valley newsletter is a little behind the times for us, covering as it does the January doings, it enables us to say that it is normal for them to foregather at Eltham United Reformed Church Hall, 1 Court Road, London, S.E.9 and to do so on the first and third Thursday in each month. Normally, the first one is the formal talk, the second the informal or ragchew session.

Milton Keynes have their dates reserved at the Lovat Hall, Silver Street, Newport Pagnell, and it is here, on February 10, that G8COB of J-Beam comes along to talk about "VHF Aerials." And, one could ask, who better than Vic Hastopp?

The natter sessions for Reigate are the first in the month, this time February 4 at the "Marquis of Granby" in Hooley Lane, Redhill; as for the formal do, this is at St. Mark's Church Hall, Alma Road, Reigate, on February 18, and will be devoted to an evening of films.

It's the 6th and 18th you have to reserve if you mean to look in on Maidenhead at their Hq. in the British Red Cross Hall, The Crescent. The first meeting of the month is a Grand Junk Sale, and for the second one G4CDL and G4CDZ get together to discuss the Design and Construction of an Integrated-Circuit Transceiver for Eighty Metres—maybe a fit lecture to go on the circuit to other Clubs on tape-and-slide? (Or even an article for the *MAGAZINE? Editor*).

It seems to be a weekly-on-Tuesdays routine at West Kent. February 7 (for an Audio Night) and the 21st are at the Adult Education Centre, Monson Road, Tunbridge Wells, while the alternates are at the Drill Hall in Victoria Road.

Now to Verulam, who seem to have taken root in the Market Hall at St. Albans; on February 19 they will be there for a session on home-brew equipment, of the "ancilliaries" variety.

Some readers of the older generations may recall the Medway Hq., the Aurora Hotel, Gillingham, as it was in the first place built as the wartime NAFFI Club. Today's Amateur Radio group can be found there on any Friday evening, the details being obtainable from G8GHN—*see* address Panel.

Westerns

Something we could all do to know about, even if it does not have any connection, directly, with radio, is the topic on February 22 at Torbay, when Peter Allen tells the group all about the Brixham Cheshire Home. In addition to this Saturday-evening affair, the group are at home on Tuesday evenings at Bath Lane, 94 Belgrave Road, Torquay.

For Plymouth, you have to find first of all the St. Andrews roundabout, then the "Breton Arms" in Buckwell Street, at the rear of which you will find the Virginia House Settlement, in which the group meets on every first and third Tuesday in the month.

One always wonders, looking at the map, whether to put Hereford into the Midlands or the West; this time we plumped for West. They get together on the first and third Friday in February, and for details of the goings-on you will need to get in touch with G4CNY (as Panel) or just turn up at the County Control, Civil Defence Hq., Gaol Street.

A subject which is not too close to radio but which is available to fill a hole in a programme in most areas is one on Crime Prevention, with particular reference to the home; it is to be given at Cornish on February 6 by Sergeant Watmore of Devon/Cornwall Constabulary, the venue being the normal one in the SWEB Clubroom, Pool, Camborne.

The Homeless Ones

We mean of course, those groups with no territorial ambitions in the local-Club context, not the candidates for the Shelter publicity treatment.

Our first one bears the neat title "Sprat" and is the first newsletter of the QRP Club, now fully in being. If you operate, or are interested in, real QRP working in the European 5-watt context, or QRPP in the W/K areas, then you should join up with this group. Drop a line to G3RJV at the address in the Panel for full details.

Another one your scribe looks forward to reading is the *B.A.R.T.G.* effort, although it must be admitted that the current issue of their newsletter is somewhat cluttered with advance notices of various contests for the RTTY fans. Anyone who runs a 'printer on the amateur bands should decide to become a member.

A good thought appears in the Christmas issue of *Radial*, the R.A.I.B.C. publication—we can hardly call it just a Newsletter!—

PLEASE NOTE!

Closing dates for this feature for the next few months will be: February 6, March 6, April 3 and May 8. These are final dates after which material cannot be taken in but will be held over for the month following.

the idea being to become aware of any disabled members and to make a special effort to go and pay them a visit. In many cases, as the writer knows, life for the disabled SWL would be vastly lightened by a visit from a "real live ham," and a chat for a few minutes. If you don't know anyone to visit locally, try asking Hq.—the Secretary's address is in the Panel.

No need, surely, to define the R.A.F. A.R.S. as being for serving or ex-members of the Royal Air Force. One notices that G3WHM, *QTHR*, is involved with the restoration of the wartime Lancaster bomber at the Museum of the R.A.F., Hendon, and is looking for: The Rotary converters for the 1155/1154 rig, a Gee Radar Indicator (your conductor works for the firm that originally made Gee, but he couldn't find one!); the H_2S equipment with its associated indicator, the Brown enclosed-type Morse key, and the D/F Indicator which was used with the R.1155 receiver. If you have any of these, even incomplete or modified ones, pass them on for this worthy objective—and while you are at it, mention it at your local ATC Squadron or R.A.F. station, so they can make that Lanc. look just right.

British Rail covers all the various parts of that widespread organisation, and keeps in contact by way of a regular *Newsletter* on the one hand and net operations on the other; for details, contact G3ILC—*see* Panel.

Finally in this section we have to mention the Amateur Radio News Service, in touch with almost every Club in the country by way of G3FPK's recent circular, and wanting to reach others. Briefly, the group is concerned with promoting co-operation between different Amateur Radio club *Newsletters* and their compilers. There is an annual Newsletter contest, in which yours is judged along with others in its class—there are numerous grades—for the title of Best. The U.K. representative for this American ploy is N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey, CR2-1EZ.

Up North

That part of the country where on old maps you find the inscription "Here be Strange Monsters!"

To go to a Hull meeting, on any Friday evening, you look for 592 Hessle Road, which is near the local flyover. At the time of their letter this programme was still provisional: February 7, a practical demonstration of the "/M QSO," with G4BHF as control; on the 14th, G8IED is to take as his subject "The Finishing Touch." G3PQY on "Aerials," will be on February 21, and finally, on February 28, G3RDM is down to give a mystery talk.

Also in that great city is the Hull University Club, from which G8EDS writes with a "view to proving we exist!" At the moment all but one of the licences held are of the G8/3 kind, and nine members took the R.A.E. this last time; so it looks a bit as though 145 MHz will be enlivened in the Hull area. For more details on the goings-on, contact said G8EDS—*see* Panel.

The Sunderland group have their Hq. at the Polytechnic, Priestmans Buildings, and the arrangement seems to be first and third Tuesdays. Again, more details from the Secretary, as in the Panel.

East Lancs. cover the area surrounding Blackburn, with their Hq. at the YMCA, on February 6—a good one on which to make the first visit, as it is a surplus equipment sale.

Over to Harrogate where a familiar handwriting not seen for many years has now turned up as their secretary, namely G8IBB as he now is. The lads get together at Christ Church Further Education Centre, Church Square, every Monday evening; they have the facility to

Names and addresses of Club Secretaries reporting in this issue.

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, London, W3-8LB.
AMATEUR RADIO NEWS SERVICE: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey, CR2-1EZ.
B.A.R.T.G.: D. Beattie, G3OZF, Mayerin, Churchway, Stone, Aylesbury, Bucks. (*0296-74 354.*)
BEDFORD: S. Felts, G8FMG, 6 White Lodge Close, Kempston, Beds. (*Bedford 852414.*)
BISHOPS STORTFORD: C. Harlow, G8BTK, Thorn Cottage, Old Mead Lane, Henham, Elsenham, Bishops Stortford, Herts.
BRITISH RAIL: L. C. Carter, G3ILC, 35 Barnfield Gardens, Kingston-upon-Thames, Surrey, KT2-5RH.
BROMSGROVE: J. Dufrane, 44 Hazelton Road, Marlbrook, Bromsgrove (*76941*), Worcs.
BURY & ROSSENDALE: M. Howarth, G8ECM, 11 Worthington Avenue, Hopwood, Lancs. (*Heywood 65911.*)
CHELTENHAM (RSGB): G. D. Lively, G3KII, 131 Mandaring Way, Wymans Brook, Cheltenham (*34785*), Glos.
CORNISH: H. Webster, G3XTF, Crandale, Gillyfields, Redruth (*6905*), Cornwall.
CRAY VALLEY: P. F. Vella, G3WVP, 78 Hurst Road, Sidcup, Greater London.
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London, SE23-3BN. (*01-699 6940.*)
DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby (*21931*), DE3-7GE.
DERBY (Nunsfield House): I. Cage, G4CTZ, 25 Petersham Drive, Alvaston, Derby, DE2-0JU.
EAST LANCS: D. Kitson, G3TRK, Roseville, Bent Lane, Colne, Lancs.
ECHELFORD: A. J. M. Wenham, G3ZXA, 28 Pinewood, Sunbury-on-Thames, Surrey, TW16-6SG.
EDGWARE: A. J. Masson, G3PSP, 62 Coldharbour Lane, Bushey, Herts., WD2-3NY. (*01-950 6827.*)
FERRANTI (EDINBURGH): N. F. MacLeod, GM4DHN, 54 Drumbraw South, Edinburgh 12. (*031-334 1098.*)
HARROGATE & KNARESBOROUGH: D. Boniface, G8IBB, 11 Holmefield Road, Ripon, Yorks.
HARROW: L. Light, G3KDL, 22 Chippenham Avenue, Wembley, Greater London. (*01-902 2570.*)
HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford (*3237*).
HULL: F. Moss, G8GDD, 334 Ings Road, Hull (*76603*), Humberside.
HULL UNIVERSITY: J. Hind, G8EDS, Students Union, The University, Cottingham Road, Hull, Humberside, HU6-7RX.
MAIDENHEAD: E. C. Palmer, G3FVC, 37 Headington Road, Maidenhead (*20107*), Berks., SL6-5LA.
MAIDSTONE (YMCA): G. H. Taylor, G4BNI, 26 Valley Drive, Loose, Maidstone (*43976*), Kent.
MEDWAY: C. R. Blackmur, G8FHN, 39 Harptree Drive, Walderslade, Chatham, Kent, ME5-0TH.
MID-HERTS: J. U. Burke, G3HEA, 15 Daltry Road, Stevenage, Herts., SG1-4AW.
MIDLAND: A. L. Walton, G3ZKQ, 243 Barnes Hill, Birmingham, West Midlands, B29-5AJ.
MILTON KEYNES: T. M. Rabbitts, G8HUM, 39 Vandyke Close, Milton Keynes, Bucks., MK17-8UU.
NOTTINGHAM: S. F. Claringburn, G8HLD, 49 Fernleigh Avenue, Westdale Lane, Nottingham, NG3-6FN.
PLYMOUTH: S. E. Croft, 2 Crozier Road, Mutley, Plymouth, Devon.
QRP CLUB: Rev. G. C. Dobbs, G3RJV, 61 Park Street, Cleethorpes, South Humberside.
R.A.F.A.R.S.: The Officer Concerned, R.A.F. Amateur Radio Society, R.A.F. Locking, Weston-super-Mare, Avon.
R.A.I.B.C.: S. R. Boakes, G3HXN, Cambridge Villa, Bristol Road, Cambridge, Glos., GL2-7BQ.
REIGATE: R. H. Mundy, G3XSZ, 2 Conifer Close, Reigate (*43130*), Surrey.
SILVERTHORN: C. J. Hoare, G4AJA, 41 Lynton Road, South Chingford, London, EA4-9EA. (*01-529 2282.*)
SLADE: J. E. Drakeley, G8GRC, 186 Conway Road, Chelmsley Wood, Birmingham 37, West Midlands. (*021-770 3474.*)
SOLIHULL: L. G. Boswell, G4AEJ, 170 Kestrel Avenue, Yardley, Birmingham, West Midlands, B25-8QX.
SOUTHGATE: B. Oughton, G4AEZ, 48 Morley Hill, Enfield, Greater London. (*01-366 7166.*)
SOUTH MANCHESTER: D. Holland, G3WFT, 7 Alcester Road, Sale, Cheshire.
SPALDING: R. Harrison, G3VPR, 38 Park Avenue, Spalding, Lincs., PE11-1QX.
STEVENAGE: C. Barber, G4BGP, 473 Canterbury Way, Stevenage, Herts., SG1-4EQ.
SUNDERLAND: P. Barker, 15 Buttermere Street, Grangetown, Sunderland, Tyne & Wear, SR2-9NJ.
SUTTON & CHEAM: A. Keech, G4BOX, 26 St. Albans Road, Cheam, Sutton, Surrey.
TORBAY: M. Yates, G3UIQ, Top Flat, 23 Waverley Road, Newton Abbot (*3025*), Devon.
WEST KENT: M. Stanton, G4CCQ, Sweetbourne Cottage, Hastings Road, Lamberhurst (*393*), Kent, TN3-8JG.
WHITE ROSE: K. R. Robson, G3VTY, Flat 7, 34 Saint James Drive, Horsforth, Leeds, West Yorkshire.
WIRRAL: H. Crofts, G3DLF, 3 Barmouth Road, Wallasey, Merseyside. (*051-638 2515.*)
WOLVERHAMPTON: J. Nicholls, G8GCV, 27 Denham Gardens, Finchfield, Wolverhampton, West Midlands, WV3-8LW.
YORK: K. R. Cass, G3WVO, 4 Heworth Village, York, North Yorkshire.

The Star Radio Club, Leeds, had their third annual Christmas jolly on December 18, with a large and enthusiastic attendance—here is some of the party. This Club has good permanent Hq. facilities at the New Inn Hotel, Bramley Town Street, Leeds, and for the occasion had not only "a glass of wine for the YL's," but also a disco, a raffle and the Birkett trade stand. And they put G3ZWA on the air as talk-in on two metres—and as talk-home too, we may presume!

operate all the HF bands there, running a KW-2000A.

Over the Border, to Edinburgh next, where the Ferranti (Edinburgh) group has just been formed; the intent is that activities will be tailored to suit the membership, half of which is licensed. On February 5, they have an array of talent to introduce them to Microwaves, tackled by GM3DXJ and GM3OXX, who will not only talk about it but demonstrate as well.

At York they have had several interesting visitors of late; meeting weekly as they do, every Thursday, they manage to catch most of the interested amateur population within their coverage. Hq. is at the British Legion Club, 61 Micklegate.

White Rose have only a provisional date for the talk by G8ENN on Semi-Conductors, but no doubt much of the time will be spent in getting fixed up for the Rally on March 30—the first mobile Rally of the 1975 season. They meet on Wednesdays at 83 Town Street, Leeds, and on the first Sunday in each month to operate around 3740 kHz to try finding other Club stations to work.

SHORT CLUB NOTICES

CLUB NAME	HEADQUARTERS LOCATION	MEETING MONTHLY
Bedford	United Services Club, The Broadway	Thursdays
Bishops Stortford	British Legion, Windhill	February 17
Cheltenham RSGB Group	Royal Crescent Hotel, Clarence Street	February 4
Derby	119 Green Lane, Derby	Wednesdays
Echelford	St. Martins Court, Kingston Crescent, Ashford, Middx.	February 10, 27
Harrow	Harrow Sea Cadets Hq., Woodlands Road	Fridays
Nottingham	Woodthorpe House, Mansfield Road	Thursdays
Stevenage	Hawker Siddeley Dynamics, Gunnels Wood Road	February 6, 20
Sutton and Cheam	The Library, Cheam	February 25

N.B.—In each case the Secretaries Name and Address appears in the Panel.

The Midlands

What better group to start this section off than Midland. They have their Hq. at the Birmingham & Midland Institute, where they will be on February 18; details on the doings are not yet known to your scribe. Incidentally, for anyone a stranger to the area, the Midland Institute is in Margaret Street.

Looking through the Wolverhampton *Newsletter*, one notes that in addition to the usual Monday evening sessions it has now been agreed to open the Clubroom on Thursday evenings as well, mainly for operating G8TA and other "practical" activities. The Hq. is at Neachells Cottage, Stockwell End.

A discussion on SSB is the Bromsgrove fare for February 14, the venue being Avoncroft Art Centre.

The second Tuesday of each month is the "main" meeting at Bury and Rossendale, with a lecture and whatever, but an informal gathering of the clans takes place on every other Tuesday; always at Mosses Community Centre, Cecil Street, Bury, unless they are having a visit.

VHF and D/F aspects of the South Manchester life are catered for on Monday evenings at the Club shack, "Greeba," Shady Lane, Manchester 23; the more formal Friday evening affairs are at Sale Moor Community Centre, Norris Road, so they have two evenings a week of activity at least.

The compiler of the Wirral newsletter seems to have got his wish for technical articles—your scribe eagerly awaits Part II of the G3EGX balun saga. The Club is at the Sports Centre, Grange Road West, Birkenhead, on the first and third Wednesdays of each month, though we notice the routine had to be modified in January.

Every Friday seems to be the routine at Slade, at Church House, Erdington High Street, Birmingham. G8FTU is to talk about Communications by Radiotelephone Systems on the 7th. An evening of informal discussion entitled "QRU?" is down for the 21st, and on February 28 they have Food—the Annual Meal!

One snag about being chairman of the Solihull group has occurred to G3CES—he's been bashed into filling a gap in the programme, and on February 18 he will be asking "Where's the Watts?" The Hq., as ever, is Manor House, High Street, Solihull.

Some of the Spalding members travel over forty miles to attend meetings. They next do this on February 7, at the Teachers' Centre, Knight Street, Pinchbeck, when G3LOC will demonstrate his home-built SSB transceiver and comparing it with a commercial design should be interesting!

Nunsfield House is in Boulton Lane, Alvaston, Derby, and the members assemble each Friday in Room 7. February 7 sees a lecture on "Car Electrics and Interference Suppression." This is followed by a discussion on the New Shack, Room 9, and on the 21st they talk about all the past Club projects. Finally, on February 28, G3TVU will entertain them with "TV Special Effects."

Signing Off

That's the lot for this time. Deadline for our next is tight, at February 6 latest for arrival at: *SHORT WAVE MAGAZINE, BUCKINGHAM, MK 18 1RQ*, marked "Attention Club Secretary." And don't forget that you should, for most effect, specify the March programme, the address for meetings, the secretary's QTH and, if possible, a telephone number. *73 & BCNU.*

For this month's Reader Small Advertisements, see pp. 689-694

NEW QTH's

This space is for the publication of the addresses of holders of new callsigns, or changes of address, in EI, G, GC, GD, GI, GM and GW of stations not already listed. All addresses published here will appear in the U.K. section of the American "CALL BOOK" in preparation. Please write clearly and address on a separate slip to QTH Section. Be sure to give correct County designation and post-code.

EI1CS, Rev. Fr. F. Buckley, St. Mary's, Drumcar, Dunleer, Co. Louth, Eire. (*Tel. 041 51211.*)

G3GKQ/A, Ribblesdale Electronics Society, Physics Laboratory, Adult Centre, Queens Road, Clitheroe, Lancs. (*G. A. Roberts, G3GKQ.*)

GD3ZND, *QSL via J. R. Bartlett, EI2BB.*

GW4CCS, Porth Grammar Technical School, Grawen Street, Porth (*2701*), Rhondda, Mid-Glamorgan, South Wales.

G4CVY, D. J. Lawrence, Estrala, St. Merryn, Cornwall.

GM4DAE, W. McMillan (*ex-GM8HVE*), 149 Easterhill Street, Glasgow, G32 8LE, Scotland.

GM4DEX, I. Sharp, Auchmuir Bridge, Leslie, Fife, Scotland.

GM4DFF, A. Thomson, 29 Hazel Place, Leslie, Fife, Scotland.

GM4DGS, D. A. Macleod (*ex-VQ9DM*), 4 Mayburn Court, Loanhead, Midlothian, EH20 9EX, Scotland. (*Tel. 031-440 0129.*)

G4DHK, R. J. Stanleigh, 35 Queens Road, St. George, Bristol, 5.

GM4DHN, N. F. MacLeod, B.Sc., 54 Drumbrae South, Edinburgh. 12.

G4DIF, D. A. Banks (*ex-G8DIF*), 22 Denton Avenue, Leeds, Yorkshire, LS8 1LE.

G4DIX, M. Bennett, 6 Parkland Close, Sevenoaks, Kent, TN13 1SG.

G4DKA, G. J. Kaye, 12 Franklin Close, Whetstone, London, N20 9QG.

G4DKK, R. D. Forsberg, 123 Harestone Hill, Caterham, Surrey, CR3 6DL.

G4DLC, B. M. Bourne, 125 Armshead Road, Werrington, Stoke-on-Trent, Staffs., ST9 0EL.

G4DLJ, B. Whawell, 24 Greenbank Drive, Stoneyford Roac, Sutton-in-Ashfield (*5473*), Notts.

G4DLR, C. E. Freeman, 32 The Paddocks, Nuthall, Nottingham.

G4DLW, D. W. Plant, 13 Highfield, Elton, Chester, Cheshire, CH2 4PE. (*Tel: Thornton-le-Moors 433.*)

G4DMN, R. A. Smye, Windle Marsh, Manorial Road, Parkgate, Wirral, Cheshire, L64 6QW.

G4DMO, M. V. Rubeck, 129 Marine Parade, Leigh-on-Sea, Essex, SS9 2RF. (*Tel: 0702 77081.*)

G4DMS, P. J. Freeman (*ex-G8ILA*), 1 Littleworth, Greens Norton, Towcester (*50632*), Northants.

G4DMX, J. H. Mitchell, 44 Elwood Road, Bradway, Sheffield, South Yorkshire, S17 4RH.

G4DNJ, A. S. Grisley (*ex-G8HQQ*), 45 Ramsdell, Stevenage, Herts., SG1 1QY.

GM4DNM, Rev. S. J. Smith, S.T.L., Ph.L., St. Ninians, Cardenden, Fife, KY5 0JG, Scotland. (*Tel: 059-272 224.*)

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G4DSC, D. Boniface (*ex-G8IBB*), 11 Holmefield Road, Ripon, North Yorkshire, HG4 1RZ.

G4DSP, Spalding & District Amateur Radio Society, c/o R. Harrison (*G3VPR*), 38 Park Avenue, Spalding, Lincs., PE11 1QX.

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G4BEX, D. B. Jones, 8 Garlands Close, Burghfield Common, Reading, Berks.

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WANTED: Eddystone receivers, Models EC-10, EB-35 and EB-37. Details and prices please.—Stoker, 67 Boldon Lane, South Shields. (Tel: 089-43 2630, 7-8 p.m.

WANTED: FT-2 auto, with mobile brackets and mic., up to specification.—Davies, GW8EHR, 153 Iscoed Road, Hendy, Nr. Llanelli, Dyfed.

SELLING: Collins 75A-3 amateur bands receiver, coverage 10-160 metres, £90.—26 Magnolia Close, Bomere Heath (419), Shrewsbury, Salop.

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DEMONSTRATION MODEL K.W. Atlanta transceiver with external VFO, £185. Also K.W. SWR bridge. £6.—Ring Parsons. G3YQE, 01-592 7800. (QTHR).

FOR SALE: Trio 9R-59DS with stabiliser, six months old, seldom used, unmodified and as-new, £40. —Johnson, G3FQX. (Tel: Winchester 63906). QTHR.

WANTED: Heathkit HW-17A with HW-17-1 DC inverter, HG-10 VFO and handbook. Details and price please. (Middlesex).—Box No. 5387, Short Wave Magazine Ltd., 55 Victoria Street, London SW1H-0HF.

SALE: Joystick V.F.A., used few days only, price £10.—Meiklejohn, Castle Steps, Bayards Cove, Dartmouth, Devon, TQ6 9AX.

FOR SALE: K.W. Dummy Load, £7. 8-ele two-metre antenna and rotator, £20. Transistor tester, £3.—Ring Sissons, 01-460 8481.

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FOR SALE: HW-202 Tx/Rx, factory-built in August, fitted with 4-tone burst generators and xtals for 145.000, 145.500 MHz (Tx and Rx), R5 and R6 also, provision for two more each Tx and Rx channels, 12v operation, £80 or near offer. Post, packing and insurance included.—Head, 5 Woolvers Way, R.A.F. Locking, Avon BS24 7DW.

WANTED: FT-200, and FP-200 AC/PSU. Also K.W. E-Zee Match. Cash waiting. Details and price please.—Currie, GM8CAT, 71 Lamerton Road, Kildrum, Cumbernauld GD7 2HT.

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WANTED: Heathkit SB-220 linear amplifier. Eddystone 888A Rx. K.W. Vespa Mk. II or KW-204 Tx. Must be in good condition. Details and prices please.—Ring Rabjohns, G3YBG, Exeter 74607.

WANTED: BX1 tower-raising motor in good condition. Good price paid. Details please.—Barnett, P.O. Box 10, Evesham, Worcs.

FOR SALE: Drake R4-B Rx with MS-4 matching speaker, excellent condition, £170 or near offer. (Hants.)—Box No. 5383, Short Wave Magazine Ltd., 55 Victoria Street, London SW1H-0HF.

SELL OR EXCHANGE: Eddystone EA-12 receiver in excellent condition, with manual. Or part-exchange with cash adjustment for Eddystone 940 in similar condition.—Alford, 5 Parsonage Road, Berrow, Burnham-on-Sea, Somerset.

SALE: HRO GC coils, coverage 0·9-2 MHz, 1·7-4·0 MHz, 7·0-14 MHz, all excellent condition, £4 each plus postage. WANTED: AR-8516L or 51-J4 receiver, must be in first class condition throughout. Details and price please. (Lancs.)—Box No. 5382, Short Wave Magazine Ltd., 55 Victoria Street, London SW1H-0HF.

FOR SALE: FR-400SDX receiver, coverage 2-160m., with SP-400 speaker, excellent condition, £160. Will deliver up to 50 miles from London.—Cross, G4DFI, 2 Chapel Road, Bexleyheath, Kent. (Tel: 01-304 3991, after 5 p.m.).

SELLING: Trio 9R-59DS receiver, coverage 550 kHz to 30 MHz, SSB, bandspread, new condition, £35.—Ring Cole, Bournemouth (0202) 20027.

FOR SALE: Eddystone 940 receiver with plinth speaker, in mint condition, £100.—Sparks, "Horse and Groom", Singleton, Chichester, Sussex (Tel: Singleton 282).

SALE: Two-metre solid-state AM Tx, with IC VFO and "DJ4BG" speech processor, 12v. operation, 5 watt output, £18. Also 2m./70cm. Rx for FM and AM, £12.—Roberts, G8FDJ, 18 Buckley Street West, Wigan, Lancs.

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WANTED: Junker Morse key, Vibroplex bug key, or similar. Details and price please.—Brown G3NQX, 3 Honister Drive, Kendal, Cumbria.

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WANTED: Racal RA-137 LF adaptor. Telegraph test sets Type TDMS-70 and TGS-20. Direction-finding loop aerial. Type AN/URR45 receiver. Collins R. 389.—Passfield, 30 Greenleaf Close, Tulse Hill, London S.W.2. (Tel: 01-674 5825).

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SALE: Anglian 1000 SSB Tx/Rx, coverage 160-10m., 1·2 kW p.e.p. input, dual VFO's built-in, CW filter, and other extras, £200.—Worvill, G4CRH, QTHR. (Tel: Chipping Norton 2724).

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FOR SALE: K. W. E-Zee Match antenna tuning unit, mint condition, £12.—Ring Leighton, Guildford 66543, evenings.

WANTED: RA-1 Rx with calibrator; will offer £18. Also BAY-96 Varactor.—Robinson, G8JMO, 3 Springfield Road, Nuneaton, Warks., CV11 4PY.

WANTED: HRO Senior Rx. Two-metre portable gear. Amateur band CW Rx, valves or transistors.—Hely, G2CYN, QTHR. (Tel: 01-935 7119, daytime).

WANTED: Circuit diagram for Class-D wavemeter. FOR SALE: CT-373 distortion test meter; also No. 16 signal generator.—Piper, 20 Kilwinning Road, Irvine, Ayrshire.

WANTED: Eddystone EA-12 amateur band receiver in excellent condition. Details and price please. (London).—Box No. 5385, Short Wave Magazine Ltd., 55 Victoria Street, London SW1H-0HF.

FOR SALE: Liner-2 with matching AC/PSU, less than 5 hours' use, £150. FT-2FB with matching AC/PSU and 24 crystals, £125. Pye F. 27 AM/FM base station, with solid-state Rx and crystals for 145 MHz, £40. Pye Cambridge, boot-mounting, AM/FM, 6-channel, with crystals for 145 MHz and control box, £25. Heathkit HA-202 FM amplifier, £30. All items carriage extra.—Williams, GW3TMH, 38 Llugwy Road, Kinmel Bay, Rhyl, Clwyd. (Tel: 0745-2859).

SELLING: National NCX-5 transceiver, coverage 80-10m., £145. Heathkit SWR bridge, £3.—Abel, G3ZHI, 9 Grove Terrace, Maltby, Rotherham, Yorks.

OFFERING: Marconi CR-100 all-band receiver, mint condition, with manual, £24 or near offer.—Ring Powrie, Romford 45733.

WANTED: Collins Type 490-T antenna tuning unit (also known as CU1658).—Ring Foulkes, Bishops Stortford 723088.

SELLING: Europa two-metre transverter, £60. Yaesu Sigmasizer, excellent condition, £100. Trio 2m. walkie-talkie with extra channel, £65; free chargeable batteries. K.W. SWR bridge, unused, £5.—Goodbody, G3YQE, QTHR. (Tel: 01-592 7800, 9 a.m. to 6 p.m.).

WANTED: Trio 9R-59 DE/DS receiver, preferably with voltage stabiliser and crystal calibrator. Also 10-80AA aerial, trap vertical, or similar. Details and price please.—Ring Powrie, Romford 45733.

SALE: Europa for two metres, complete and as new, £65. Two-metre AM/CW Tx, 3-10 watts output, two 6BW6's modulator, small and compact, £13. Withers 2m. converters, IF 28-30 MHz, £7; 70cm. converter, 14-16 MHz IF, £8. Green and Davies 2m. CW Tx, with QQVO-310, xtal, unused, very small, £9. Eddystone 680X Rx, coverage 0·5-30 MHz, offers invited.—Roberts, G3AQX, Cottage Farm, Wessington, Derbys. (Tel: Alfreton 2943, or Ripley 3189 office hours).

EXCEPTIONAL OPPORTUNITY: Eddystone 940 receiver; K.W. E-Zee Match and KW-160 antenna matching units; loud speaker; complete set of spare valves; heavy copper aerial wire (unused); set of Pyrex glass insulators. All in mint showroom condition. Any test. The lot, £175.—Ring Leighton, Guildford 66543.

FOR SALE: Asahi Echo 8G vertical trap antenna. 10-40m., £10. Buyer collects. **WANTED:** Joystick VFA and Joymatch Mk. III ATU.—Ring Geoffrey, 01-556 4236 after 6 p.m.

FOR SALE: Trio 9R-59DE Rx with phones, speaker and Joystick antenna, all in good order, £33 complete. (Staffs).—Box No. 5386, Short Wave Magazine Ltd., 55 Victoria Street, London SW1H-0HF.

FOR SALE: Telford Communications "G8AEV" Mk.II two-metre converter, IF 4-6 MHz, hardly used, £9 including postage.—Barnes, Butcombe, Morchard Bishop, Exeter.

SALE: Eddystone 680X, £60. Eddystone 888A, £65. Trio JR-310, £55. Teleton TF-182B 8-band, £30. Sanyo Super 7-band, export model, £35. All in excellent condition. **WANTED:** Sony CRF-5090, SX-122, HQ-180A, or similar. Details and price please.—Andrews, 12 Malton Way, Shipton Road, York, YO3 6SG. (Tel: York 59035).

WANTED: Pye Bantam, AM. **SALE:** Two-metre converter, DL6SW kit, with crystal, £3.—Ring Dent, Cheltenham (0242) 27246, evenings.

SELLING: Codar AT-5 Tx with AC/PSU, DC/PSU, T.28 Rx, control unit, supply leads, manual, first class condition, £38. Also Class-D wavemeter, £6.—Moon, G3YAX, QTHR. (Tel: Warrington 37138).

WANTED: Circuit diagram for Sony CRF-150 13-band receiver.—Ingham, 24 Richmond Caravan Park. Reeth Road, Richmond, Yorks.

WANTED: Leak Point One Plus "N" Series pre-amp., or Varislope Mono "N" Series. Details and price please.—Williams, The Farmhouse. Bledington. Kingham, Oxford.

WANTED: Valve Type YL-1240 or 8458 for Pye Cambridge. Also circuit for Europa transverter and Collins 75S-3B.—Wilson, GM4BIT. QTHR. (Tel: Prestwick 79491).

EXCHANGE: Televet 877, comprising oscilloscope. crystal signal generator, wobbulator, EHT voltmeter, etc., FOR AR88D, or offers?—Ring McKae, Midsomer Norton 412551. (Avon).

MARCH Issue: To appear February 28, single copies at 36p post free will be despatched first-class mail on receipt from printers. Orders by February 26, with remittance to: Circulation Dept., Short Wave Magazine Ltd., 55 Victoria Street. London, SW1H-0HF.

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